EAST ENGINEERING
TS
1080
.P219
ONE DAY

JUN 3 1948

THE PAPER TRADE JOURNAL.

VOL. I. NEW YORK, MAY 27, 1872. NO. I.

Paper TRADE JOURNAL

1947

VOLUME 124, NO. 27

Serving the
PAPER MAKING
INDUSTRY

75th ANNIVERSARY
Founded as a newspaper in 1872

The Paper Trade Journal

DEVOTED TO THE INTERESTS OF
Paper Makers and Dealers, Stationers, Publishers and Printers.

Published every fortnight, at $2.00 a year.
Single Copies, ... 5 Cents.

NEW YORK, MAY 27, 1872.

ADVERTISING RATES—SEMI-MONTHLY.

[illegible]

COMMUNICATIONS SOLICITED.

Communications on matters of interest to the trade are earnestly solicited from all quarters, and if used will be liberally paid for. Items of news, and those of all kinds in relation to the state of the mills, etc., will also be gladly received.

HOWARD LOCKWOOD,
Publisher and Proprietor.
No. 11 Park Place, New York.

PROSPECTUS.

In introducing the first number of the PAPER TRADE JOURNAL to the public, we wish to call attention, first, to the need of a high-toned and superior journal to represent the American paper interest, and, secondly, to the mode in which we propose to carry on this periodical.

In all kinds of industry, owing to increased competition and other causes, it is becoming necessary to carry on business with greater exactness and care. Hence, a periodical which will furnish full and trustworthy information in relation to any given interest, cannot fail to benefit all those connected with that interest. Knowledge is power, and all the information relating to the paper manufacture and trade which can be presented, will add to the knowledge of each subscriber and reader of such a journal, and so increase his capacity for conducting his business successfully.

As an organ of the latest ideas, discoveries and opinions of the trade, it will also become so representative in character as to prove indispensable to every paper dealer or manufacturer who wishes to know what others are doing in the occupations in which he is concerned.

Such a periodical should have the following features, which will be found in the present JOURNAL:

First: It should belong to and be conducted by persons who are in no way pecuniarily connected with the trade, so that its independence and freedom from personal bias or interest may be assured.

Second: Its managers should have a good knowledge of the paper business, and of the wants of those in the trade. The proprietor of this JOURNAL having lately left the paper trade, in which he has had large experience, to become engaged in the publishing business, these two important conditions are hence fulfilled by him to the letter.

Third: Such a journal should be issued at least twice a month, and even oftener if possible, in order to give frequent and fresh news of all kinds.

Fourth: It should contain, together with articles on matters of interest to the trade, a careful review of the state of the market in different grades of paper, paper stock, chemicals, coloring materials, and all kinds of supplies, with reliable quotations of the same from unquestionable sources.

Such are the features which we believe should belong to a good trade paper. Whether the present JOURNAL fulfills these conditions must be left to our readers to decide; but we can at least claim, that, having raised so high an ideal, we are more likely to deserve support than if we had started with a lower standard of excellence.

IMPROVEMENTS IN PAPER MANUFACTURE.

The number of patents which are being applied for and granted on improved methods of manufacturing paper or novel applications of paper pulp for domestic or industrial uses, shows that individuals in the trade are alive to the need of progress and improvement, while it also demonstrates the necessity of an organ like this JOURNAL to record these inventions, and bring them to the attention of those who are most interested in them.

From the carefully prepared list, in another column, it will be seen what is the nature of the patents which have been granted since January first of the present year in this department of industry. They include not only patents for new methods of extracting vegetable and wood fibre, but also for improved machinery of all kinds, to be used in the manufacture of paper, including appliances for cutting, drying, calendering, bleaching and the like, besides inventions for using paper pulp in making different implements and articles.

From the number and variety of these patents, not to mention the resources of and additions made to old patents, it is evident that there is no lack of inventive talent among paper men, and it is only necessary that the trade should encourage and at once avail themselves of these improvements in order to secure even greater prosperity for themselves than they have gained in the past.

Every mill owner should be alive to his interests, and wide awake to learn how he can carry on his work more cheaply or to greater advantage to himself and his customers. He should not imitate the spirit of Diogenes in his tub, and churlishly decline proffered aid, but rather, like the great Goethe, whose dying words were "more light," should ever be on the look-out for increased knowledge, which always means increased power.

We shall keep a careful record of all patents relating to paper, stationery, printing, etc., which are issued, and will be able to supply full particulars of their claims, with copies of the specifications to such as wish them, so that our readers will be kept fully informed respecting late inventions.

MARKET QUOTATIONS.

It has been, and will be in the future, a prime object of this journal, to supply as full and accurate quotations of current market rates for paper and paper materials, both at New York and in other leading cities throughout the Union, as it is possible to obtain; and we can point with some pride to the information of this kind which we now lay before our readers, and which is only a foretaste of what we hope to furnish in the future. At the outset, however, it may be well to disarm criticism by anticipating it, and we say frankly that we do not expect to avoid mistakes by even the greatest care in preparing these tables, and therefore we crave the patience of our readers in case unavoidable errors creep in. Again, it is probable that complaint will be made that our quotations are either too high or too low to suit the wishes of some parties. Wholesale dealers will naturally wish to have a difference made between the rates accepted for large and small, or broken lots; while, on the other hand, the small dealers, out of town or elsewhere, will desire to know the very lowest figures which can be quoted. We shall strive to avoid both horns of this dilemma, though we fear it will be hard to satisfy every one. We shall try to draw a distinction, whenever it is possible, between extreme and ruling prices; but we shall always feel free to quote actual prices paid, whether they are over or under the ruling rates, as this is in reality the only way to get a live idea of the state of the market. In doing this we may offend some dealers, but we shall certainly benefit the great majority of the trade, whose interests we shall in all cases regard most highly.

With this fair warning, we await the result patiently and calmly, knowing that our aim is disinterested, and that in time, if not now, they will be fully appreciated by the trade.

TINKERING THE TARIFF.

Congress has at last got through with another of its successive convulsions over the tariff, and the industrial public can again breathe freely for a time until the retrenchment fever seizes our legislators again.

The free traders wanted the revenue reduced one hundred millions, and even Secretary Boutwell recommended that half that amount should be taken off the duties. Nevertheless, through the stout resistance of the champions of home protection in Congress the actual reduction by the bill which passed the House is but $42,436,901, of which only $12,691,182 comes from the internal revenue, $11,076,609 from customs, and nearly all the remainder from tea and coffee.

No accurate estimate can be made of the amount which the reduction will take from the receipts by duties on paper and its manufactures, though on paper alone the loss is estimated at over $8,000. For the benefit of our readers we copy the clause of the tariff relating to paper in full:

"On printed books and all other printed paper, bound or in sheets, except newspapers, magazines and periodicals for public libraries, colleges, schools, philosophical societies, etc., and except books in foreign languages or English editions of old books unrevised for twenty years, 12½ cents per pound; on newspapers, magazines and periodicals unbound, 6 cents per pound; on all paper, 90 per cent. of existing duties."

We call the attention of our readers to the report, in another column, of the action of the Philadelphia Book Trade as an indication of the mode in which the new tariff is viewed in that city. The revenue rates on imported literature have long caused much dissatisfaction among our publishers and printers, who have for a long time provoked a specific duty of twenty-five cents per pound on these articles in order to protect and maintain home industry. The concession of only one-half of this claim might have been accepted by them as satisfactory, but for the additional clause which provides for the admission, free of duty, of all books printed in the English language of an edition unrevised for twenty years. This amendment would virtually give to foreign printers a monopoly in the production of standard works, and would transfer the important industries involved in the production of bibles, prayer books, old school-books, and all English literature dating back twenty years, to foreign publishers and printers. It would thus, to quote the words of one of the Philadelphia protestants, "prove absolutely destructive" to all persons interested in this class of publications, and hence it is natural that a decided protest should be made against the above clause in the tariff.

We presume meetings will be held in other cities to take action in the matter, and we shall be glad to learn of any steps which may be decided on by the book trade at such meetings.

Since the above was written the United States Senate Committee has prepared several amendments to the new Tariff Bill, which, if passed and adopted by the House, will considerably modify, if not wholly nullify, the obnoxious clauses in that document.

NEED OF A PAPER TRADE JOURNAL.

The need of a good and truly representative journal, as the organ of the paper trade, hardly requires argument, but is simply self-evident. The paper trade and its connections is one of the largest industries in the country, and there are certainly enough matters of interest relating to it to fill a journal like the present, and which, if rightly presented, would benefit the trade immensely. Not only does sound reason justify the expectation that such a periodical is needed here, but this opinion is further fortified by precedent. In other countries, where the paper manufacture is carried on to any extent, as in England, France and Germany, there are organs of this kind published, which meet with proper support from the trade, and which are valuable both to their owners and to their readers. The following are the names of several of these periodicals:

IN ENGLAND.

The Paper Makers' Monthly Journal. London.

IN GERMANY.

Centralblatt (Vereins-Organ) über das Deutsch. Papier-fabrikation. Issued fortnightly, [illegible].

IN FRANCE.

Moniteur de la Papeterie française. Organ officiel des fabricants de papier. Issued fortnightly. Paris.

Journal des fabricants de papier. Issued fortnightly. Paris.

Journal des Chiffons de l'affichage, de la papeterie et des ventes publiques en gros de matières premières et produits divers. Issued weekly. Paris.

To this list, with all due modesty, we now add the PAPER TRADE JOURNAL, which we expect in time to make the best periodical of its kind in the world. All we ask is a fair degree of support, and sufficient aid from our friends in the way of furnishing facts such as every one in the trade can give, if they will only take a little trouble about it, and our success is assured.

OUR "DIRECTORY."

We are convinced of being able to make the PAPER TRADE JOURNAL worth of itself a good deal more than we charge for a card in our "Directory." This is a very cheap way of keeping your name continually before the trade all over the country; at the same time it offers a good opportunity to give us valuable assistance.

All paper-makers and dealers, &c., wishing to promote the success of our enterprise, will please authorize us to place their name in the "Directory."

WHY EVERY ONE SHOULD SUBSCRIBE.

We offer the following brief but forcible reasons why every one should subscribe to the PAPER TRADE JOURNAL, and which we submit to the consideration of all of our readers:

First. Because we give facts of great importance to every person who is at all interested in the production, sale or use of paper. Our market reports, showing the price of all kinds of paper and paper materials, cannot fail to be of value to every man who wishes to keep himself posted about the state of the market. Then we aim to give all late information of inventions patented, which relate in any way to the paper business; the acts or debates of Congress or other legislative bodies in relation to the trade; besides items of manufacturing news from all parts of the country, as well as from paper producing and paper manufacturing countries abroad. By carefully gleaning our newspaper exchanges, and through correspondents in each section of the Union, we expect to keep this department of news, which is of prime importance in every journal, so fresh and full that it will give, at a glance, a view of the state of the trade in all quarters.

Secondly. Every one should subscribe, because we shall give opinions on all the leading topics which are of interest to the trade, aiming at once to be representative, yet independent, while we will furnish space for communications from all quarters upon these topics. We expect also to obtain articles from the ablest writers in the country upon the scientific and practical features of paper making, and are now in correspondence with several eminent gentlemen with this object.

These reasons should suffice to convince every candid mind that it will pay to take this journal, and therefore we close our exordium with the pithy advice, "Subscribe."

THE WATER SUPPLY.

The late welcome rain has relieved the fears of manufacturers all over the country by checking the protracted drought. Our snowless Winter was followed by a rainless Spring, and but for the change which has just occurred, we must have had more stoppages of mills, more damaging fires in the woods, and other disasters. Relief has now come, and the refreshing storms of last week will effect much good to all classes, and be gladly hailed in all parts of the country.

TO THE PRESS.

The paper interest is one of the largest in the country, ranking third in the list of American industries, yet up to the present time it has hardly been represented at all in journalism. There are a few periodicals abroad devoted to the business, and the scientific journals occasionally contain articles on the production and use of paper. No journal, however, yet exists which is an adequate organ of the paper interest, and which is a forum for facts and opinions relating to it. To supply this deficiency is the aim of this journal, and we ask for it the aid and sympathy of the press, who not less than any other body, are deeply concerned in paper and its production.

We ask paper makers and dealers to examine the claims of this JOURNAL carefully and critically. We offer it not as a literary luxury, but as a business necessity, and ask only that it shall stand on its own merits. Let it be treated the same as any other commodity offered for sale, and ask yourself, "Does it really amount to what is is claimed to be? Will it be of value to me in my business?" and lastly "Is it worth the price asked for it?" If every one will calmly ask these questions, we have not the least doubt that their answers will all be in the affirmative, and we shall have at once hosts of subscribers.

CORRESPONDENCE.

A leading house in the trade, and owners of valuable patents of paper-making machinery, write us from Cleveland, Ohio, as follows:—"We will send you two wood-cuts for our card in your new paper. We think a good paper devoted to and in the interests of the paper trade should and would be well patronized."

A prominent Boston manufacturer writes as follows: "Any information or favor we can do for you will be cheerfully given or granted. Wishing you full success in the new enterprise, we remain.—"

From a large Philadelphia importer of rags, etc., we receive a very encouraging letter, containing valuable information and stating, "We will be pleased to become subscribers and advertisers in your proposed paper."

A leading Machine Company sends us from Vermont the following: "We send you wood-cut by express to-day. Please insert in two issues, and send bill for subscription and advertisements."

A first-class house writes from New Orleans, "Should be happy in any way to assist your enterprise, and furnish you with any information in our power."

A leading Paper Mercantile establishment, whose works are at Newton Lower Falls, Mass., sends us the following: "We think favorably of your proposed enterprise and wish you success. We expect to be subscribers to your Journal."

Market Review.

OFFICE OF THE PAPER TRADE JOURNAL, SATURDAY EVENING, MAY 25, 1872.

THE MONEY MARKET for the past week has presented no very new features. [illegible]

Gold opened as follows:

Monday, May 20	113¾	closed	113⅞
Tuesday, " 21	113⅞	"	113¾
Wednesday, May 22	113¾	"	114
Thursday, " 23	114	"	113⅞
Friday, " 24	113⅞	"	113⅞
Saturday, " 25	113⅞	"	113⅞

[illegible]

DOMESTIC RAGS are somewhat dull, especially the lower grades. [illegible]

OLD PAPERS, &c.—Most grades of paper are very dull. [illegible]

MANILLA ROPE is not in quite so great demand. [illegible]

GUNNY BAGGING is in fair demand at present. [illegible]

FOREIGN RAGS AND PAPER STOCK.—[illegible]

ROSIN.—The market for strained has been more active, [illegible]

STRAW.—The market in the earlier part of the week was rather in seller's favor, the receipts being slight, demand moderate. The last few days prices were easier and unsettled. The few late selling bring late prices.

LIME.—There is no change to note. The demand is limited, but there is very little stock offering on the market.

Common	$1 30
Lump	$1 40

JUTE BUTTS.—Notwithstanding the anticipated removal of the duty of six dollars a ton, Butts are somewhat firmer the past few days. [illegible]

From Messrs. Ralli, Coleman & Co's circular, dated Calcutta, April 12, 1872, we learn as follows: "Jute Butts are only procurable in very small lots, and in value no sales are reported. [illegible]"

The following table will show clearly the exact state of the market as stocks, etc., of Jute Butts and Rejects, up to the 21st of May:

JUTE BUTTS AND REJECTIONS.

		1870.	1871.	1872.
Consumed in the United States	Bales.	[illegible]	[illegible]	[illegible]
Imported into the United States from January 1st to May 21st				[illegible]
On the way to the United States, April 12th				[illegible]
Loading at Calcutta last dates for the United States, April 12th				[illegible]
Stock in Importers' and Speculators' hands in New York and Boston				[illegible]
Stock in 2nd hand, January 1st, all hands				[illegible]
Deliveries same Jan. 1, 1872, New York and Boston				[illegible]

[illegible]

CHEMICALS.—The Chemical Market has shown increased dullness in most articles. Prices are somewhat weaker, though it is the opinion of well informed parties that there will be no further decline at present.

The proposed changes in the Tariff, together with very large arrivals, are given as the chief causes for the present depression.

Bleaching Powders are very dull, though we hear of no sales under 4¾ to 5¼. [illegible] Ash has declined somewhat in face of the very heavy arrivals, and the scarcity of bottoms to unload. Sales amount to about 600 tons during past week at 2 1-16 to 2¼c gold. Alum is in fair demand; sales of 200 bbls. Patent Ferrous at 3½c currency. Bi-chromate Potash and Copperas are in good demand: we note sale 100 bbls. of the latter at 1¾c. Prussiate of Potash quiet. Sugar of lead in light demand, without special change. Sales of [illegible] lbs. at 19c for Brown and 20¾ for White.

Blue Vitriol barely steady, owing to a decline in Copper. Sulphuric Acid is quiet. We hear of an attempt to advance the price by combination, but it has not as yet been consummated. Sales of 1,000 carboys at 1¾ to 1⅞ for 60 to 66 deg. We also note sale of [illegible] Terra Alba at 1¼c.

THE COAL MARKET.—From the "Coal and Iron Record."—The Anthracite market has passed into rather a depressed state, despite the late prices for tide water. The Delaware Lackawanna and Western Railroad Company have announced their sale by auction of [illegible] tons of Scranton coal, to take place on the 29th inst., at the usual place and time. [illegible]

The Boston Shipping List of the 23d inst., says there is no change to notice in English Coal. The sales have been at $27 per ton, and in moderate demand at that price. Nova Scotia Coal is in fair demand with further cargo sales at $6.50@$7 per ton. The demand for domestic coal continues to be checked by the scarcity of vessels, and high rates of freight. There have been cargo sales of Cumberland at $7.50@$7.75 per ton, delivered here, and Penn and Westmoreland gas at $8 per ton, delivered in Philadelphia. Anthracite has been in moderate demand at $9 per ton, and cargo prices are nominally $7.50@$8 per ton.

NEWS PAPERS.—The general trade of the week presents no new features. Book Papers of all grades are quiet. Publishers are in market for but very little beyond their regular supply which is usually ordered ahead. Tag Fibre is in fair demand at ruling prices. Straw news is in good demand. The lower prices of Bleach and ash have probably prevented the expected large advance in figures. Mills are usually very full of orders, and we can quote the market as of a very good tone. Manillas, light weights, are in good demand at present rates. Heavy weights of most grades are in fair demand at weaker prices. Market generally dull. There appears to be a good demand for stout wrapping, and as ruling prices it meets with quite a ready market. The export demand is quite large at present.

NEW YORK MARKET.

Prices Current.

RAGS, ROPE AND BAGGING.

White Shirt Cuttings, No. 1	[illegible]
" " 2	[illegible]
Mill Assorted Whites	[illegible]
Unbleached Muslins	[illegible]
City Whites	[illegible]
New Cotton Threads	[illegible]
New Cotton Strips, light	[illegible]
" " dark	[illegible]
No. 2 Whites	[illegible]
Cotton Canvas	[illegible]
Linen "	[illegible]
Country White Rags	[illegible]
Country Mixed	[illegible]
Seconds, (City)	[illegible]
" " colors	[illegible]
Colors per 100 lbs	[illegible]
Manilla Rope	[illegible]
" " unused	[illegible]
Hemp	[illegible]
Gunny Bagging	[illegible]
Kentucky "	[illegible]
Burlap "	[illegible]
Mixed "	[illegible]
Heavy Twine Stock	[illegible]
Jute Butts	[illegible]
Jute Waste	[illegible]
Straw, long Rye per 100 lbs	[illegible]
" short "	[illegible]
" Oat	[illegible]
" Wheat	[illegible]

SHAVINGS AND OLD PAPER.

White Collar Cuttings, all paper	[illegible]
" " " muslin lined	[illegible]
" Envelope "	[illegible]
Hard White Shavings, No. 1	[illegible]
Soft " " " 1	[illegible]
White Shavings, " 2	[illegible]
Mixed Shavings, part white	[illegible]
Imperfections, No. 1, book folded sheets	[illegible]
" " Heavy stock	[illegible]
Book Stock, No. 1	[illegible]
" " " 2, light	[illegible]
Prints	[illegible]
Pure Manillas	[illegible]
Paper " and Envelopes	[illegible]
Commons	[illegible]
Binder's Board Cuttings	[illegible]
Straw Board Cuttings	[illegible]

ENGLISH RAGS, &c.

[illegible]

ENGLISH OLD PAPERS AND SHAVINGS.

Hard Shavings, No. 1	[illegible]
Soft " " 1	[illegible]
White and Colored Shavings	[illegible]
Paper Collar Cuttings	[illegible]
Old Envelopes and Letters	[illegible]
New Newspapers and Pamphlets	[illegible]
Old " and Letters	[illegible]
Colored Shavings	[illegible]
Old Printed Books	[illegible]
Old Blank Books	[illegible]
Brown Papers	[illegible]
White and Buff Railway Sheets	[illegible]
Railway Tickets	[illegible]

HAMBURG RAGS, &c.

LINENS.

[illegible]

COTTONS.

[illegible]

ROPE.

[illegible]

OLD PAPERS.

[illegible]

LEGHORN RAGS.

[illegible]

ALEXANDRIA RAGS.

[illegible]

TRIESTE RAGS.

[illegible]

MEMEL RAGS.

[illegible]

BELOOTH RAGS.

[illegible]

SPANISH RAGS.

[illegible]

GENOA RAGS.

[illegible]

CHEMICALS, COLORING MATERIALS, &c.

In quoting Bleaching Powders, Soda Ash and other materials, we give the regular New York wholesale prices, and in this connection we will remark that parties who order a few casks [illegible], at a time, cannot expect to purchase at the lowest figures.

[illegible]

PAPER MARKET.

[illegible]

BOSTON MARKET.

There has been a quieter tone to the market the past few days, but prices are steady, and no material change is reported. [illegible] We quote dealers' selling prices:

[illegible]

PHILADELPHIA MARKET.

REPORTED BY MESSRS. [illegible] & CO.

RAGS, ROPE AND BAGGING.

[illegible]

SHAVINGS AND OLD PAPER.

[illegible]

LEGHORN RAGS.

[illegible]

We learn of an auction sale of some bales Leghorn rags at Philadelphia, some time since. Very fair prices were obtained.

CINCINNATI MARKET

REPORTED BY MESSRS. JOHN [illegible]

[illegible]

PAPER TRADE JOURNAL *is entered as Second Class matter at the Post Office at East Stroudsburg, Pa., under Act of Congress of March 3, 1879. Publication Office at Lockwood Trade Journal Co., Inc., 34 N. Crystal St., East Stroudsburg, Pa. Printed in U. S. A. Copyright 1947 by the Lockwood Trade Journal Company, Inc. The contents of* PAPER TRADE JOURNAL *including all articles, illustrations, etc., are covered by copyright and may not be reprinted except by permission.*

THE PROGRESS OF PAPER

With particular emphasis on the remarkable Industrial development in the past 75 years and the part that Paper Trade Journal has been privileged to share in that development.

Published by

The Lockwood Trade Journal Company, Inc.

15 West Forty-seventh Street

New York (17)

ACKNOWLEDGEMENTS

As the PAPER TRADE JOURNAL reached its seventy-fifth year of publication, May 27, 1947, the publisher, Mr George E. Lockwood, believed the occurrence demanded recognition of the event by issuing this volume of the 75th Anniversary Issue of the PAPER TRADE JOURNAL. Innumerable sources of information and assistance were approached by the editor, and he now wishes to thank each one for the complete effort and cooperation so cheerfully given. For reference, for text, for pictures, for personal endeavor, then, the editor here wishes to set down the names of those of whom he has record at the moment. To all others who have helped, he wishes to also express his appreciation.

The Smith & Winchester Manufacturing Company, South Windham, Connecticut; Harry E. Weston, Hercules Powder Company, Wilmington, Delaware; W. C. Arthurs, for his chapters on "Containers," "Books, Newspapers and Magazines," and "Greeting Cards"; Bird & Son, Inc., East Walpole, Massachusetts; "Chronology of Paper and Paper Making," by Joel Munsell, Albany, New York; Crane & Company, Inc., Dalton, Massachusetts; C. T. Crocker, Burbank & Company Association, Fitchburg, Massachusetts; Curtis Paper Company, Newark, Delaware; De Bellis, Buoni, & Coppo, New York, for a great number of drawings and illustrations herein, as well as consultation on art work; Robert Case Dennison, Case Brothers, Incorporated, Manchester, Connecticut.

M. C. Dobrow, Writing Paper Manufacturers' Association, New York; R. K. Ferguson, Taggart Corporation, New York; Fitchburg Paper Company, Fitchburg, Massachusetts; "From Paper Mill to Pressroom," by William Bond Wheelwright, George Banta Publishing Company, Menasha, Wisconsin; Ellsworth Geist, S. D. Warren Company, Boston, Massachusetts; P. E. Hodgdon, Keith Paper Company, Turners Falls, Massachusetts; F. Arthur Howland, Dr. Dard Hunter, of the Dard Hunter Paper Museum, Massachusetts Institue of Technology, Cambridge, Massachusetts, for his personal interest and assistance in preparing this book and its illustrations; International Paper Company, New York.

J. Ralph Jackman and associates, Massachusetts Institute of Technology, Cambridge, Massachusetts, for the photogrpahy of the Dard Hunter Paper Museum; Harry I. Jensen, for his most valuable assistance as Associate Editor of this book, and author of the several chapters on American mills and development; Joseph Kaiser, Joseph Parker & Son Company, New Haven, Connecticut; Kalamazoo Paper Company, Kalamazoo, Michigan; George B. Kennedy, R. P. Andrews Paper Company, Washington, D. C.; E. E. Keough, L. L. Brown Paper Company, Adams, Massachusetts; Kimberly-Clark Corporation, Neenah, Wisconsin; The Alfred A. Knopf Company, New York; David C. Knowlton, Knowlton Brothers, Incorporated, Watertown, New York; Samuel M. Langston Company, Camden, New Jersey; the Robert Gair Company, New York.

Albert Leonard, C. F. Crehore & Son, Division of The Leonard Company, Newton Lower Falls, Massachusetts; Lawton W. Luther, for his chapters on "Paper Products," and "Government Printing Office"; W. S. McClellan, P. H. Glatfelter Company, Spring Grove, Pennsylvania; E. J. McGee, Dennison Manufacturing Company, Framingham, Massachusetts; The Mead Corporation, Dayton, Ohio; Tad R. Meyer, Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin; The Davey Company, Jersey City, New Jersey; F. C. Hyuck & Sons, Albany, New York; Stephen Goerl, Bulkley, Dunton Organization, New York; Ralph A. Powers, Robertson Paper Box Company, Incorporated, Montville, Connecticut; Jermain B. Porter, The D. M. Bare Paper Company, Roaring Spring, Pennsylvania; John L. Riegel, Riegel Paper Corporation, New York; T. N. Sandifer, Washington D C., for many statistics; Arthur P. Schulze, for his chapter on "Advertising Paper Products;" Secretary of the Treasury, Washington, D. C. for his permission to use the reproduction of paper money; James W. Shettel, for his chapter on "Wall Paper"; A. J. Sottung, Byron Weston Company, Dalton, Massachusetts; St. Regis Sales Corporation, New York; Glenn Stewart, Kalamazoo Vegetable Parchment Company, Kalamazoo, Michigan; The American Paper and Pulp Association, New York; Louis Calder, Perkins-Goodwin Company, New York. The News Print Service Bureau, New York; Miss Rita Theumes, for her chapters on "History of the American Paper & Pulp Association," "History of the TAPPI," and stories of the development of the other paper organizations, as well as that of the PAPER TRADE JOURNAL, and constant research work and assistance with this book; Tileston & Hollingsworth Company, Boston, Massachussets; Horace C. Trecey, the Miamisburg Paper Company Division, American Envelope Company, Miamisburg, Ohio; E. A. Weihenmayer, The Jessop & Moore Company, Philadelphia, Pennsylvania; C. Frederic Wellington, for his assistance on several chapters of this work, inclusive of the Paper Museum; West Virginia Pulp and Paper Company, New York.

Sincerely,

Reuben R. Thompson
Editor-in-Chief,
75th Anniversary Edition, PAPER TRADE JOURNAL

August 1, 1947

CONTENTS

Prospectus of the First Paper Trade Journal, May 27, 1872, by Publisher Howard Lockwood		4
Preface of the Present Paper Trade Journal by Publisher George E. Lockwood		5
	Map of the Origin of Paper, Egypt to the Near East	6
Chapter I	Papyrus to Parchment to Paper	7
	Map of Europe	14
Chapter II	Paper Comes to Europe	15
Chapter III	Era of Invention Arrives with Paper Machines in Europe	31
Chapter IV	Advancing Mechanical Progress Brings More Inventions Abroad	45
Chapter V	To America, Then, Came Paper	61
Chapter VI	And America Improved Paper After the Revolution	72
Chapter VII	An Infant Industry Gradually Becomes Larger	79
Chapter VIII	Paper Machinery Recast Entire Business of American Mills	92
Chapter IX	Progress Continues in American Mills	104
Chapter X	Old American Mills Expand Through the Years	116
Chapter XI	What Were and Are the Markets for All Grades of Paper?	147
Chapter XII	'Rags-to-Riches' the Story of the Making of Pulp	161
Chapter XIII	Some Figures on Pulp and the Paper Thereof	180
Chapter XIV	For Nearly Seven Centuries Watermarks Have Distinguished Paper	187
Chapter XV	Without Forests There Would Be No Pulpwood	195
Chapter XVI	Increasing Circulations Demand More and More Newsprint	203
Chapter XVII	Hand-to-Machine This Industry Went Forward	221
Chapter XVIII	Machinery Constantly Improved to Make More Paper	235
Chapter XIX	Increasing Importance of All Kinds of Containers	247
Chapter XX	From China Came First Wall "Hangings" or Screen Paper	257
Chapter XXI	For More Than 1,000 Years Paper Products Have Expanded	267
Chapter XXII	Advertising of Paper Products A Matter of Quality, Service	277
Chapter XXIII	Biggest Buyer of Paper Is Government Printing Office	293
Chapter XXIV	Money Makes the World Go 'Round—Also the Paper	302
Chapter XXV	Long Rolls of Paper Make Short Rolls of Stamps	309
Chapter XXVI	Books, Newspapers, Magazines Use Bulk of Paper	315
Chapter XXVII	Greeting Cards Gain in Favor Over the Long Years	332
Chapter XXVIII	Story of Paper Told at the Paper Museum	343
Chapter XXIX	Organization of American Paper and Pulp Association	356
Chapter XXX	Technical Association of the Pulp and Paper Industry	373
Chapter XXXI	Oldest Trade Association Is Writing Paper Manufacturers	376
Chapter XXXII	And So Three-Quarters of A Century Passed with the Paper Trade Journal	381

The Paper Trade Journal

DEVOTED TO THE INTERESTS OF
Paper Makers and Dealers, Stationers, Publishers and Printers.
Published every fortnight, at $2.50 a year.
Single Copies, ... 5 Cents.

NEW YORK, MAY 27, 1872.

ADVERTISING RATES—SEMI-MONTHLY

One Square 12 lines (one inch),			one insertion,		2 00
"	"	"	four	"	7 50
"	"	"	eight	"	12 00
"	"	"	twelve	"	15 00
"	"	"	twenty-four		25 00

Directory and one copy of paper, $10 00 per year.
One insertion column New Goods, $3 00.
Machine Tenders and Engineers, one insertion, $1 00.

THE AMERICAN NEWS COMPANY, Sole Agents for supplying Dealers.

Communications on matters of interest to the trade are earnestly solicited from all quarters, and if used will be liberally paid for. Items of news, and facts of all kinds in relation to the state of the mills, etc., will also be gladly received.

HOWARD LOCKWOOD,
Publisher and Proprietor,
No. 14 Park Place, New York.

PROSPECTUS

In introducing the first number of the PAPER TRADE JOURNAL to the public, we wish to call attention, first, to the need of a high-toned and superior journal to represent the American paper interest, and, secondly, to the mode in which we propose to carry on this periodical.

In all kinds of industry, owing to increased competition and other causes, it is becoming necessary to carry on business with greater exactness and care. Hence, a periodical which will furnish full and trustworthy information in relation to any given interest, cannot fail to benefit all those connected with that interest. Knowledge is power, and all the information relating to the paper manufacture and trade which can be presented, will add to the knowledge of each subscriber and reader of such a journal, and so increase his capacity for conducting his business successfully.

As an organ of the latest ideas, discoveries and opinions of the trade, it will also become so representative in character as to prove indispensable to every paper dealer or manufacturer who wishes to know what others are doing in the occupations in which he is concerned.

Such a periodical should have the following features, which will be found in the present JOURNAL:

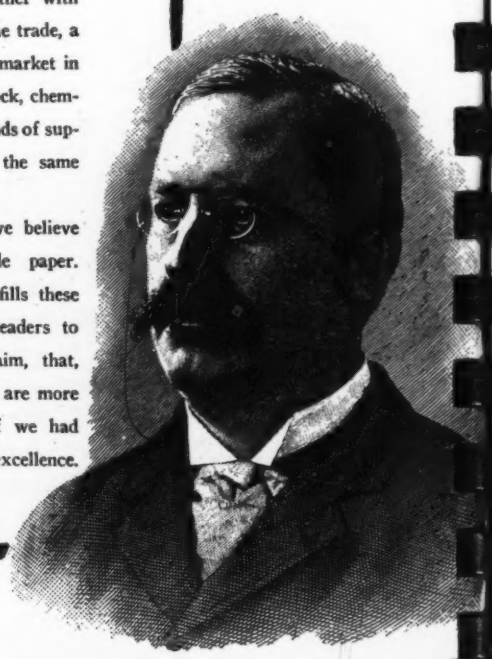
First: It should belong to and be conducted by persons who are in no way pecuniarily connected with the trade, so that its independence and freedom from personal bias or interest may be assured.

Second: Its managers should have a good knowledge of the paper business, and of the wants of those in the trade. The proprietor of this JOURNAL having lately left the paper trade, in which he has had large experience, to become engaged in the publishing business, these two important conditions are hence fulfilled by him to the letter.

Third: Such a journal should be issued at least twice a month, and even oftener if possible, in order to give frequent and fresh news of all kinds.

Fourth: It should contain, together with articles on matters of interest to the trade, a careful review of the state of the market in different grades of paper, paper stock, chemicals, coloring materials, and all kinds of supplies, with reliable quotations of the same from unquestionable sources.

Such are the features which we believe should belong to a good trade paper. Whether the present JOURNAL fulfills these conditions must be left to our readers to decide; but we can at least claim, that, having raised so high an ideal, we are more likely to deserve support than if we had started with a lower standard of excellence.



HOWARD LOCKWOOD
Founder

PREFACE.

IN an industry as old as paper making, 75 years is insignificant. But when the tonnage of paper, produced in those 75 years, increases from 317,637 tons to 20,000,000, that three-quarters of a century assumes proportions as a measure of progress, not a measure of time.

Week after week it has been our privilege to detail in the columns of the PAPER TRADE JOURNAL the news and progress of this industry, and of the grandfathers and fathers of the present day generation of paper men. In this single number we offer that story of their efforts, to remind all of us of the rich traditions and opportunities of this industry.

As an old, old industry, it was slow to approach technical maturity. As recently as 1921, when the PAPER TRADE JOURNAL first started publication of the TAPPI (Technical Association of the Pulp and Paper Industry) Section, this organization had only 346 members. Now there are 3,000 TAPPI members.

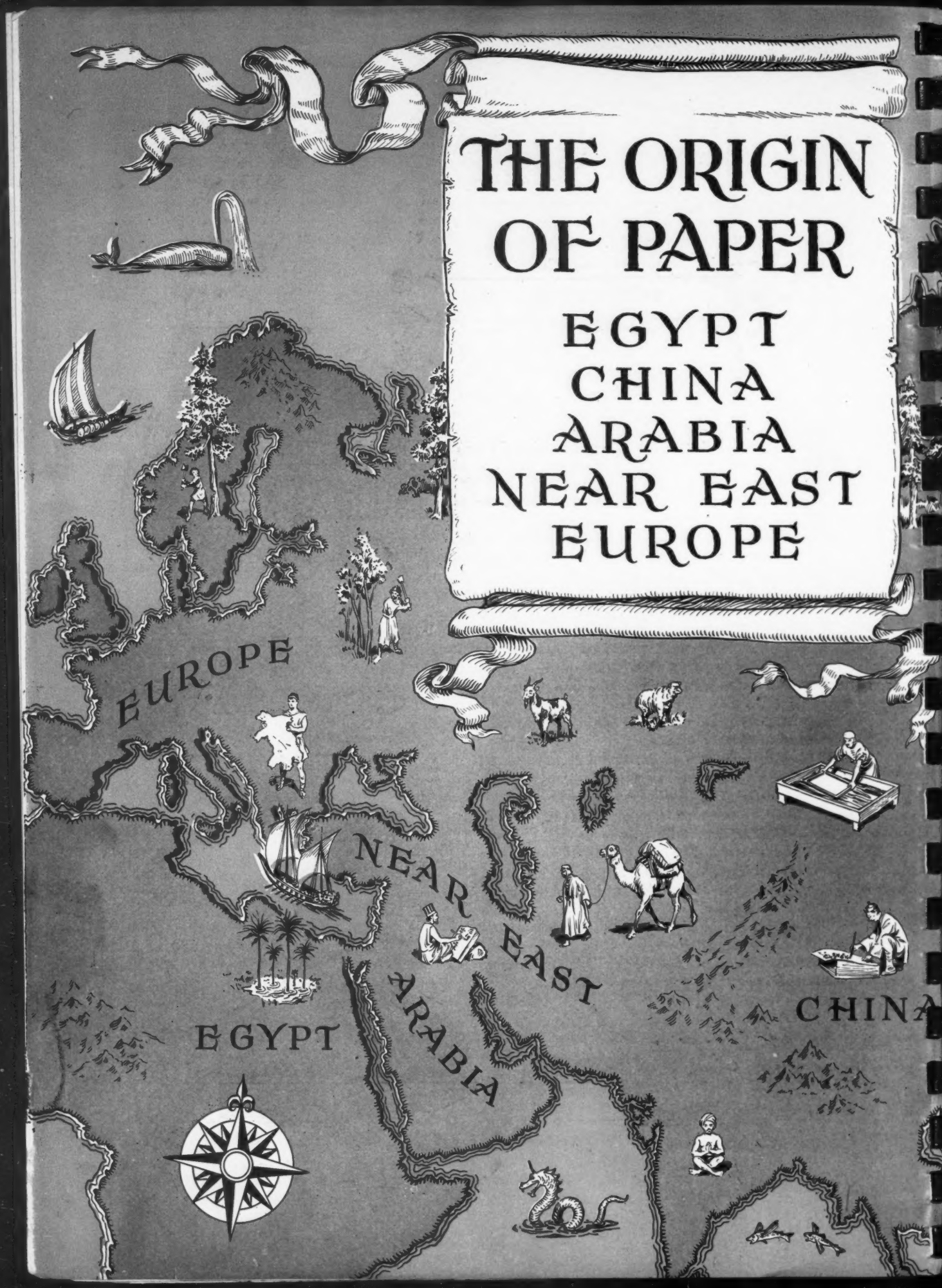
Since 1872 the growth of our educational, communication and distribution systems received their greatest impetus from the ability of the paper maker, and, faced today with a paper shortage, although 20,000,000 tons may be provided this year, who can doubt that even greater need for paper lies ahead?

In the process of outlining 75 years of the publishing of PAPER TRADE JOURNAL, all of us have been forced to one conclusion; that, in the next 75 years, the record of this industry will make the 1872-1947 period as inconsequential, except as history, as was the thousands of years preceeding the mechanization and technical development of paper making.

With respect for the old timers, and astonishment at the ability and adaptability of present day paper makers and machine builders, we publish this 75th Anniversary Number of PAPER TRADE JOURNAL.

George E. Lockwood

PUBLISHER


THE ORIGIN OF PAPER
EGYPT
CHINA
ARABIA
NEAR EAST
EUROPE
EUROPE
NEAR EAST
ARABIA
EGYPT
CHINA

CHAPTER 1

PAPYRUS TO PARCHMENT TO PAPER

For Centuries These Silent, Faceless Figures Have Endured While Methods for the Recording of Time Changed from Bricks of Common Baked Clay, to Obelisks, to Papyrus, to Parchment, to Paper

TIME means little or nothing to scientists. These men of many parts usually consider the coming and passing of time mere historical dating, as the recording of events. And, as events, startling events, occur constantly as days and years run along into centuries, the event of paper, perhaps, was just another occurence of necessity, of the apparent adaptation of man. If the early Egyptians found that papyrus made its very own humble date in history. events, and if papyrus, this acquatic plant of the prolific Nile, was adaptable to human needs, then papyrus made its very own humble date in history. It succeeded the previous cumbersome use of baked clay, in bricks, obelisks, or chiseling with very crude copper tools in stone, the record of the Pharaohs.

Parchment, from the skins of sheep, goats, was the means of recording similar events, previously or subsequently. But the fact remains that even this astonishing original use for the record of fact has been lost in the misty antiquity of time. Babylonian baked clay bricks, recording more or less useful information of that Biblical period, were but a transient method of writing and of communication. But wood, too, waxed, was also used to illustrate the symbolism of the Herods. Metal plates, usually from copper, as a rule, plates of the Indian and African elephant's ivory, were likewise used, according to the convenience of the locality. And it has been recorded that the skins of animals, indeed, transitory, as live skin, but more permanent, perhaps, as parchment, were additioned by the skin of humans, too. In the French Sorbonne there appears to be a manuscript written on human skin, and so certified. Also an early copy of some of the Books of the Bible was inscribed upon the skin of a woman.

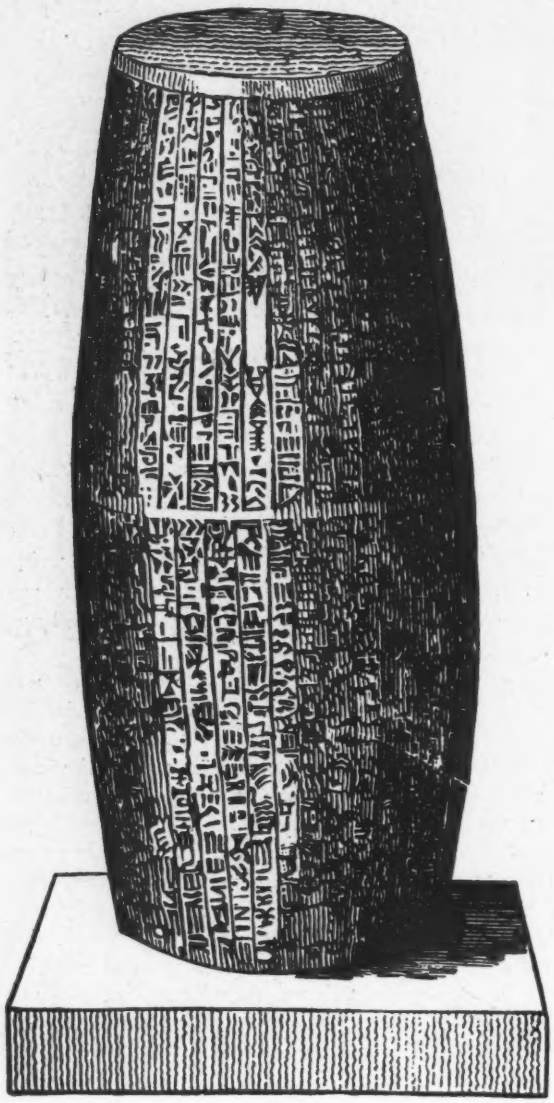
Leaves of trees, their bark, were used, as well. Almost simultaneously with the issue of this 75th Anniversary of the PAPER TRADE JOURNAL there have been two events of record illustrating the antiquarian's estimate of time, the ceaseless effort to learn more about that time. First, was the meeting in Boston, as the past year closed, of astronomers and their associates. They were, and are, learned men. And they insist that the Heavens tell the only complete story of time. That the universal cosmic dust and chemical content of numerous gaseous materials are ceaselessly struggling to form new planets — new stars, to us. That this effort is timeless. Too, that the universe is so extensive as to be beyond our imagination, yet, on Earth, we are all ever coming closer together because of the ancient event of paper.

In the recording of the second outstanding event of the past and present years, we have the current explorations of Egyptian antiquarians, who are still digging in the mysterious sands of the past. They recently unearthed what is believed to be the oldest tombs of Egypt. In those tumbled tombs they found

more of the methods of recording time. Papyrus, with its soft stem, cellular, preserved these records, to be read by men of the many museums of the world. But, as time is thus exposed to the moderns, who shall say when papyrus, itself, was first used?

Problems of the past, and how to create this method of record, were to take a plant only ten to twenty feet high, triangular in shape, and convert it into the medium of communication, through the use of casual characters of expression. Egyptian slaves took in hand ordinary muscle shells, from the abundant river, and pointed them with their crude, soft copper. Using Nile water as their liquid medium, they placed layer upon layer of papyrus, alternately horizontal and vertical, until the sheet was made to required size and thickness. This was pressed and dried in the ever present sun of the Pyramids. Finally, the persistently toiling slaves polished this completed sheet with shells and stones, until smooth enough to write upon. Some twenty sheets came from each stalk. Those sheets closest to the pith made the superlative papyrus. Greeks, to whom much of this papyrus was exported, named the product. Romans, as they came, saw, and conquered, then selected the corresponding Latin term, papyrus, and took their share, and more, of the precious papyrus.

Egyptians Made Papyrus



(From Joel Munsell's Chronology of Paper)

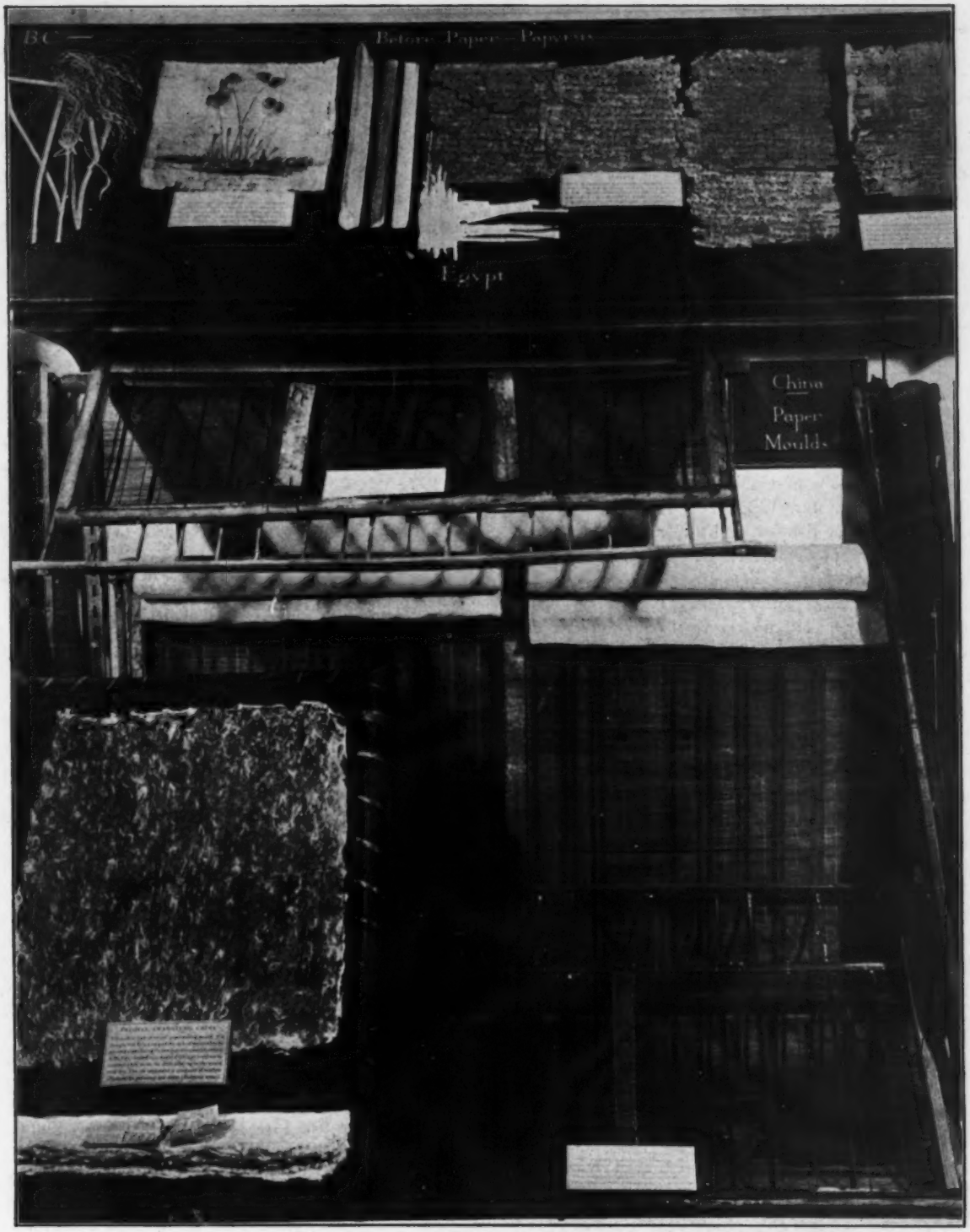
Before Paper—Babylonian, or Chaldean, Brick

Characters cut into clay, on a cylinder, afterward baked to preserve the records. Cleopatra's Needle (such as seen in Central Park, New York) is stone, in pyramid, or obelisk form, cut with similar hierglyphics.

But, again and again, historians differ as to the time of this first papyrus use and event. Alexander the Great was said to have possessed it; Varro says not. Four hundred years before Christ papyrus was said to have been used; again not. Yet Herodotus, dating back an even 500 years B.C., says it was used before his time, and that it was freely bought and sold in the Near-East Oriental markets.

It took the Romans, in their ever eager over reaching, to improve the Egyptian papyrus. For they began to size it. They used flour. So they made it white, as the Egyptian was brown, or yellow. Startling to know, also is that while Egyptian papyrus was made and sold in such quantity as to be available for export at Alexandria in the time of the Romans, it was not until A.D. 1851 that a modern paper mill was established in Egypt at Boulac, very close to cosmopolitan Cairo, and that this was a then up-to-date vat-mill. About 1873 the Khedive of Egypt took this mill over (as he absorbed almost everything), employing 218 people. It made 165,511 reams of real writing paper, not papyrus, of course, and another 347 hundredweight for wrapping.

So much papyrus was made in the ancient Alexandria that the trade was practically controlled there



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

From the Beginning of Time

A portion of a display case in the Paper Museum devoted to the making of Egyptian papyrus, and in the commencement of the making of true paper in China. Papyrus was made by slicing the stalks of the plant, and laminating the thin slices together in much the same manner as a cabinetmaker makes laminated wood. Papyrus antedates true paper by thousands of years. Substance we know as paper was invented by a Chinese eunuch, Ts'ai Lun, in 105 A.D. Mould shown (in the lower left side of the case) is the type of implement that Ts'ai Lun used at the beginning of paper making. The three-division mould at the centre is the original "transfer" type that came into use in the second century, A.D. Other moulds shown in the case are of the regulation "laid" bamboo pattern, such as are used in present-day papermaking in China.

until the fifth century. Rome bought so much of it, for the early records of the Caesars, that Theodoric at last abolished the tax, much as we do it in this country, today, when reciprocity leads to the more friendly relation of free trade. And this business continued into the eleventh century with Italy, when parchment came along, gradually, to displace the antique papyrus. Also, paper made of flax, hemp, via pulp, reached through the years, but not from Egypt and its famous cotton yield, but from, of all places, the distant Chinese.

For it is a very well established basic fact that China originated the pulp paper. Paper, as paper, absolutely divorced from papyrus and parchment, is as Chinese as gunpowder and paint. Although papyrus and parchment were used as paper terms in the Orient, Near-East, and even in Europe in the early Christian era, quite frequently pulp paper was indicated in use and in history. But it is a misnomer to believe that cotton initiated the first pulp. Rather, in the extensive investigations of Dr. Wiesner in Austria, at Vienna, and of the Swiss Briquet, and of Dr. Karabacek, their botanical surveys discovered nothing except fibres of hemp and flax.

During the first century A.D., a Chinaman named Tsai Loun (or Ts'ai Lun) worked out the pulp problem with flax and hemp. This was at Lei-Yang (also as Kueiyang) in Hung-Tcheou (Kueichou), province of Hounan (Hunan), just north of the over populous Canton. Some one wrote, with crude stick and paint, the Buddha Books. These were of the second and third centuries, A.D. They are undoubtedly the most ancient of existing manuscripts written upon paper. They were discovered in storied Turkestan, around Niya, by Aurel Stein, and now in possession of the British Museum. That famous historical repository also has other old documents of oriental paper of the tenth century, listed as "2,600" in the catalog. And the manuscript of Gharibu-el-Hadith, dating from the ninth century, in the University of Leyden. While

Parchment from Sheep and Goat Skins

(From Joel Munsell's Chronology of Paper)

Papyrus in its Native Egyptian Haunt

Bibliotheque Nationale, in Paris, has an Arabic paper manuscript listed as "2,457." All these, evidently written on pulp of Oriental texture, are the evidences of the early work of the Chinese and their Arabic neighbors, who succeeded to the knowledge of the then intricate art.

But some careless historians and botanists claimed that the early Chinese pulp and paper was of silk origin. This is evidently not so, because silk, alone, will not make paper of workable nor of durable quality. Some refuse silk was evidently used by the Chinese, but they mixed it with bamboo and mulberry bark, too, as well as with some rags. It is related, also, that Confucius knew of no paper at all 500 years B.C. Neither did the Chinese then have ink. They used paint on bamboo pads, and their pens, unlike the almost automatic ever-lasting ball-points of the present, were of wood, sharpened to writing points, much like the later quills.

When the modern explorer Sven Hedin was looking around the past glories of Lou-Lan, some ancient paper scrolls were found. And the French adventurer Pelliot, at Tun-Huang, in Kan-Sou (Kansu), discovered Sanskrit texts of peculiar characters, known as "kutchas," on Chinese paper. Those dated from the third and fourth centuries, A.D. They also repose in the French National Library, Paris.

And when the aforementioned bontanically inclined Dr. Wiesner investigated these papers he found that the Chinese were, even then, using not cotton, as once supposed, but bark and hemp, with a mixture

of varied rag stock. Some of these documents were in antiquated Sogdian. They came from Turfan and from Kashgar.

Using their common beasts of burden, camels, the Chinese caravans carried cargoes of valued paper into all of available Asia, and to the Near-East, in Persia. This was a heavy and costly transport, via a sand route from the Pacific to the Mediterranean, mapped by the distinguished Marco Polo. In the thirteenth century this was the highway of commerce and all trade between the antidiluvian Gobi desert and the ancient desert of Takla Makan, through the convenient Tarim valley, to Samarkand. Thus was paper brought to the Persians. Samarkand paper became famous, as the Persians also learned the secret, improving the Chinese crude formulae.

Probably this exposure of Chinese methods occurred in the seventh century, yet some manuscript has been found at Serinde dating from the sixth century. Puzzling to historians, this recent discovery antedates the battle of Tharaz River, in Turkestan, which the Chinese lost, thereby permitting Chinese captives to tell the enemy how China made its paper. And it also exploded the theory that Samarkand had not been able to make paper until after this historic year 751.

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Chinese Woven Cloth, Used as B.C. Book

Woven cloth made an excellent surface for Chinese brush calligraphy, and the Chinese fashioned writings into beautiful scrolls. This was the first form of book, and was used in China as early as 200 B.C.

Arabian manufacture of paper was immediately and practically aided by the captured Chinese, some of whom were experienced paper makers. Samarkand became an ever more important point of Persian (now Iranian) production. "Umdet-el-Kuttab", a technical manual of the eleventh to twelfth centuries. relates the story of Persian production of pulp. Ancients of the ilk of Ta-Alibi (Tha-'Alibi) and El Khwasini (known as Kazwini) told of Arabian manufacture. Mandarins of China, jealous of their paper and their paper makers' knowledge, endeavored to withhold additional secrets of the trade. But the Arabians took the cue from the enslaved Chinese soldier-workers, and found that they could produce

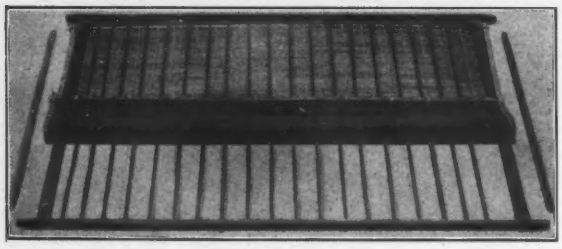
1,001 Arabian Nights of It

and sell better paper than the Chinese originators.

One reason Samarkand became a paper center was on account of the flax crop there. Also of hemp plantings, then profuse. And the Arabs had progressed in irrigation, permitting an abundance of pulp-pure water. Arabian native intelligence, aided by this progressive propagation with paper, spread to the far corners of the Moslem world. In fact, as the kings of Europe wallowed in ignorance, unable to write or to read, as were their peoples, the storied Baghdad palaces of the Arabian Nights of Haroun-al-Raschid were alive with numerous scrolls of written manuscript, even then.

As early as A.D. 95 Du Halde said the Chinese had made paper of the bamboo and mulberry bark, of the inner surface. Sheets of paper, ten to a dozen feet long, in quantity, were made of the inner bark of the bamboo. Spread of this knowledge went along to Korea, thence to Japan, from captured Korean priests. But the Japanese used silk and linen, plus characterizations on remarkable thin chips of wood. And in A.D. 284, for some unrecorded reason, the Romans sent to China and its emperor, as a gift, 30,000 sheets of a very strong brown paper, made

Caravans of Paper for Arabia



(Courtesy, Dard Hunter Paper Museum, Mass. Inst. of Technology)

Peking Paper Making Mould

Papermaking mould, such as used near Peking. This is a flexible type of mould, in which the "laid-lines" are formed of bamboo, and the "chain-lines" of horse-hair. Deckle sticks may be seen at either side of the mould. This pattern of bamboo mould has been used in China since the second century, and is still the most common type employed in that vast papermaking country, where there are literally thousands of mills, employing hundreds of thousands of workers.

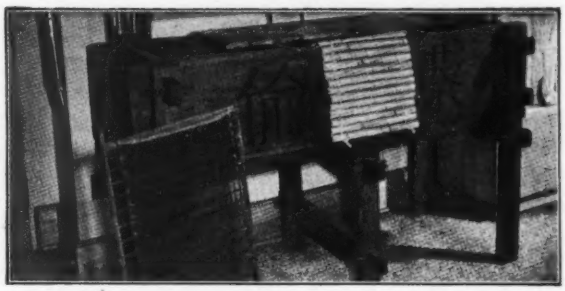
of tree bark. So th defeat of Koa-Sien-Tohe (also known as Kao Hsien-chih), at the Tharaz, was merely an extension of the pulp and paper gift to the world of the west. Arabs simply took possession of the added facts, and improved upon a situation that had practically impounded paper to the east, and at transport and tariff prices to the west that made paper almost prohibitive.

About the year 600 A.D., when Europe and Asia, too, were struggling with their early paper problems, it is known that Central American Indians used paper of their own make. It may have been years previously that the Mayans had made paper. At least, their records are still available on native paper, and their religious rites and documents are written upon huun paper. Toltecs succeeded the Mayans in the production of early American paper. They improved the quality. In the year 1168 the Aztecs took over from the Toltecs. In central Mexico the Aztecs used the Toltecs' paper, originally Mayan. Montezuma dynasty proscribed that 24,000 packages of paper must be stored in the government buildings, as a reserve. As this was approximately one-half million sheets of paper, it was regarded as a suitable amount for the records. And, as the Aztecs were good business men, deals of other merchandise were often transacted in paper, as a commodity currency. After battles and wars with local tribes, the tribute was frequently paid in paper. Cortez, conquering the Aztecs, sent specimens of paper and Indian books to Spain. Aztec paper, like the Mayan, was white, though heavy. It was made from the bark of local trees. But some of the Indian paper was in various colors, according to the color of the tree bark. Amatl was the native name for paper. In Vera Cruz, today, decendants of Aztecs continue to make native paper from the surrounding forests. Fig trees are also used in the peninsular.

But the flow of paper, plus its eventual propaganda of public prints and diffusion of knowledge to the multitude, was still sadly lacking in the distant west. Division of world communication, by the age-long institution and bitterness of varied religious beliefs, held the eastern and western peoples apart, as it has succeeded in doing for centuries, past and present. Control of the Mediterranean was in the forceful hands of the Islamic rulers. Papyrus had been the free-flowing item of commerce of the Egyptians, but paper was to be reclassified as contraband. Papyrus exportation to Rome and to Athens ceased with the start of the combative eighth century. Sailing craft feared to carry paper, subject to international seizure. Not merely was paper an article of war, but so were essential foods, of course, as in practically every war. Paper was merely added to spices, to edible and cosmetic oils, to many more items of constant necessity of the embattled nations.

Crusaders had stopped the aggression of Mohammedanism when Martel had become victor at Poitiers. But the resentful Arabic governments simply stopped all intercouse with the west, and paper was an importantly cumulative article that ceased to be shipped across the secretive sea. Marseilles, formerly an important port for paper, or papyrus, now became merely a port of call for ships on other business. What little paper that came through, on this ancient black market, was used, not for manuscript nor writing of any sort, but for the base commercial utility of old fashioned lanthorn night-lights and candles. Wax and papyrus tapers consumed the small importation, and the western world acquired necessary light, but not the required light of knowledge.

Saracens, now masters of Egypt, prevented papyrus, too, from going anywhere, except to friends of the Arabic world, even in Asia. Rome no longer had sufficient papyrus to carry on its extensive



(Courtesy, Dard Hunter Paper Museum, Mass. Inst. of Technology.)

Ts'ai Lun's Name on Chinese Vat

Papermaking vat from Hangchow, Chekiang, China. Characters carved in the front of the wooden vat are the name of Ts'ai Lun, inventor of paper in A. D. 105. A "laid" bamboo mould, capable of forming paper measuring 20 by 34 inches, rests against the vat; another mould for forming three separate sheets of paper at one dipping, is on the vat. Horizontal bamboo apron protects the worker from dripping water. Two or three vats of this kind would constitute a Chinese paper "mill." Much of the newsprint, used by the during the Japanese aggression, was made with primitive appliances of this type.

business. But parchment was substituted in Italy. Spain, too, had long claimed priority of papyrus and paper import, along with Italy. Casri, a Spanish writer, had said Mecca was the source of paper supply, through a certain Joseph Amru. But both China and Persia had preceded Mecca in pulp and in the finished paper.

Parchment, strong and sustaining, had been known in Asia and in Europe since the second century, A.D. Its remarkable strength laid in its common source—the always plentiful and useful sheep and the goat. So, as papyrus became more and more doubtful, and as paper did not enter Europe in any quantity at all, parchment was used, even by the popes of Rome, along in 900, for their papal bulls. They believed papyrus or parchment to be enduring materials, and that paper, as such, from pulp, was fragile, brittle, worthless. Yet some papal manuscripts have been found on cotton paper, dating from the eighth and ninth centuries.

This use of parchment by priests and monks gave rise to a method, said to have been devised by the monks, of washing the parchment free and clear of inks. They also scraped it clean. Writings and records of pronounced and valid antiquity were thus destroyed. Religious liturgical passages were substituted. Cost of parchment was another most forceful reason for the reuse of the material.

Greek writings were, however, translated to a waiting world in the east. Schools of limited advantages turned the scholastic Greek into Arabic, and Ptolemy, Archimedes, Euclid, Aristole, and Galen were so given to Arabic barbaric shieks, while elegant velvet-and-plush Europeans did without, perforce.

Syria commenced to make paper from local hemp. Hempen crops were prolific in that area. Damascus, Tripoli, Bombyx (known as Mombyce) still make hempen paper. This was a very thin paper, known to antiquarians as charta damascena and charta bombycina. It fully replaced papyrus, and many old texts are still entirely legible on its remarkably preserved surface. This was along in the end of the ninth, and in the start of the tenth centuries, A.D.

Odd fact is that the Aphorisms of Hipprocrates, in Arabic, have been found on linen paper, dated about 1100, A.D. Some Arabic manuscipts were also written on satin paper, about this period. They were elaborately embellished with ornamental scrolls, all sorts of unusual decoration. Arabs liked curious circus colors. And they used them, handsomely. Some of these completed combinations of colors were so bright that they reflected the face.

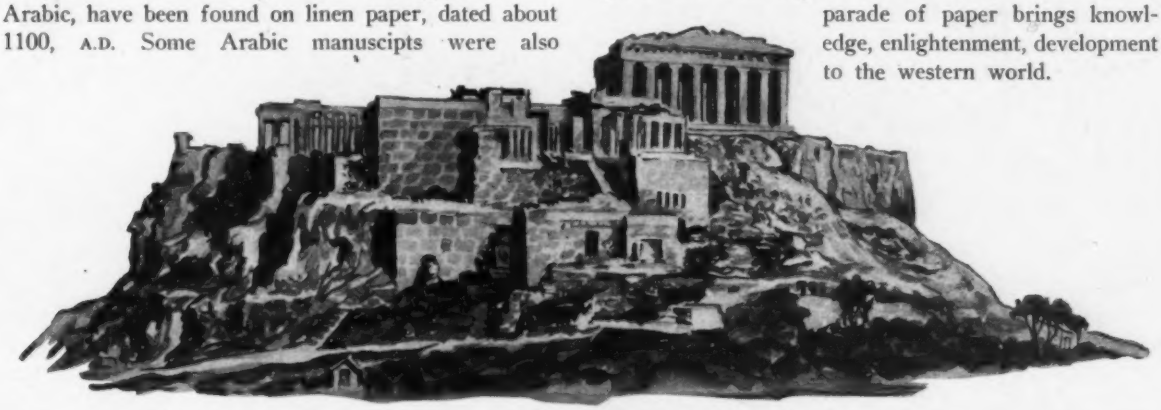
Papyrus, held back from Europe and even parts of Asia by the then current reasons of religious war, economic conditions (the enhanced price), and lack of ordinary exchange between east and west, as well as by the succeedence of pulp paper, gradually became extinct. This is related as being about 1170, A.D. Eustathius says it was not in use when he wrote.

Peculiar fact, too, is that the Jews of Asia became proficient in the manufacture and control of paper. One of the oldest specimens of paper in Paris is a series of bonds drawn on paper by the commanders of the expeditions of Richard I, of England, as cash warrants to the Jews. They were for the crusade, in Asia, of that fighting king.

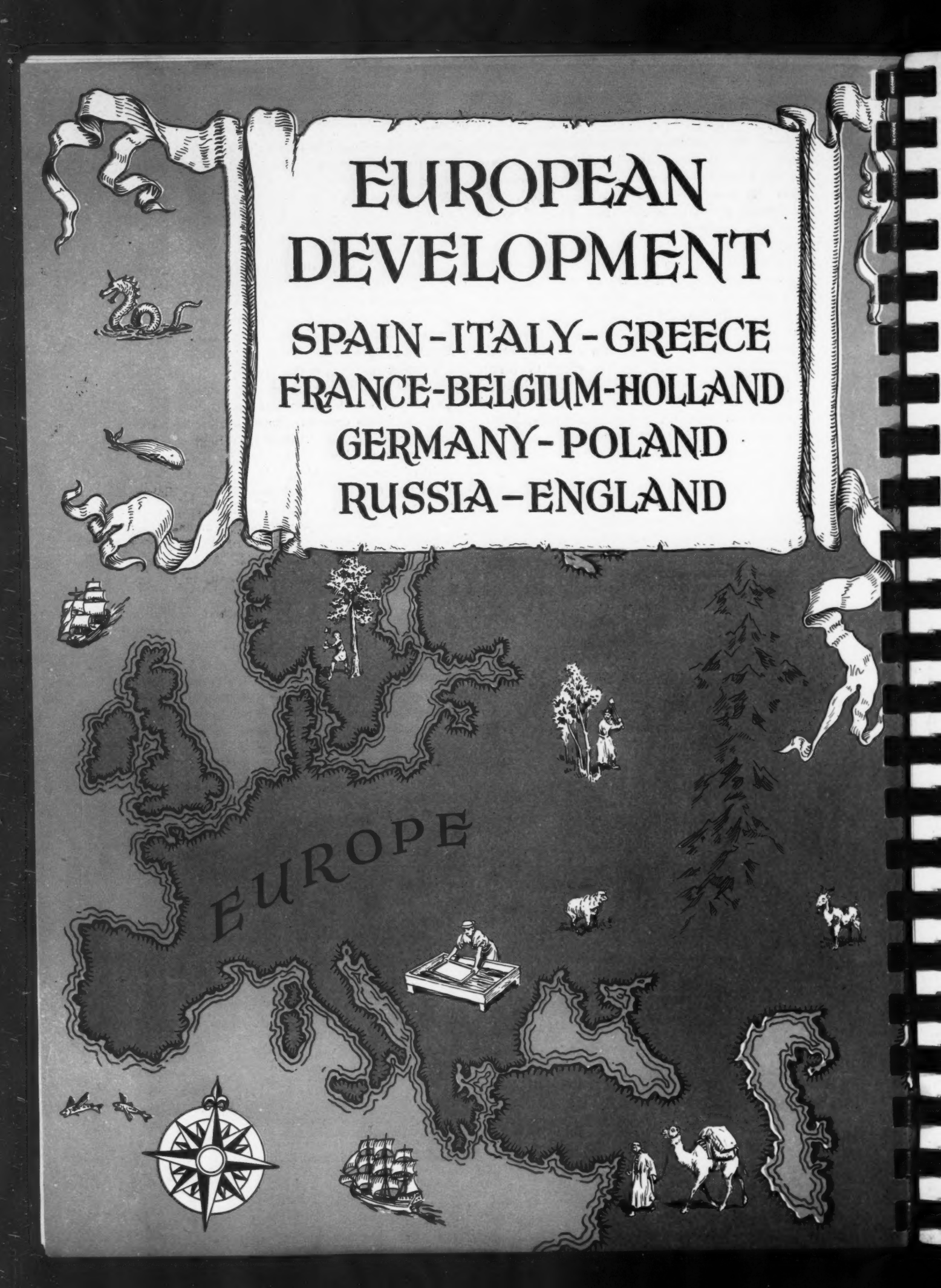
Another odd fact is that some Egyptian diplomas, on paper, were used in England and in Germany about 1200, A.D., but soon petered out. Parchment temporarily succeeded as a material of worth and substance, believed to be most durable. Maps of parchment were also used, but not previous to the sixth century, A.D.

France continued to use what Egyptian papyrus and paper it could find, and in 1311, A.D., it was almost in exclusive use. All of Europe was then struggling with paper problems. Transition to pulp paper from papyrus and parchment, via vellum, was now in order, and the ancient records show that Europe was then coming into its own, as a paper production and consuming area, just as the ultra exclusive battle bars of Asia were permitted to be removed after the wars of Moslemic conquest.

Italy, Spain made concurrent claims for priority of paper production. To Spain the apparent laurels go. France, Austria, Germany, Holland, England followed, in course. From the ancient east, then, the saga of paper is unwound, through the ages, to the expectant west. As China, and its Arabian paper productive counterpart, travel ever westward, the parade of paper brings knowledge, enlightenment, development to the western world.



Greece Had Culture, Plus Papyrus, Parchment, Paper


EUROPEAN
DEVELOPMENT
SPAIN - ITALY - GREECE
FRANCE - BELGIUM - HOLLAND
GERMANY - POLAND
RUSSIA - ENGLAND
EUROPE

CHAPTER II

PAPER COMES TO EUROPE

And Then the Moors Carried Paper and its Making to Spain

GIVING Spain the benefit of the doubt about the first European production of paper, it is still apparent that Italy and Greece evidently received the first papyrus and parchment shipments from Egypt and the Near-East. That very fact of the naming of papyrus by the Greeks, and the subsequent translation of the word into the Latin papyrus by the Italians, is sufficient to prove that the Greeks and the Italians had the first imports. It was fully five hundred years after the Chinese adaptation of paper pulp and paper itself before Spain and nearby Europe were able to produce paper from pulp.

It is noted, in early Hebrew accounts, 270 B.C., that parchment had reached such an improved state of production that Jewish elders, by edict of the high priest, carried a copy of the law to Ptolemy Philadelphus. This was engrossed in letters (or characters) of gold upon the finished parchment or skins. And the job was so beautifully accomplished that the seams of the skins were not visible. Parchment, of such a character, was also used in Europe, notably in both Greece and in Italy, while Spain, too, used what it could get.

But the actual manufacture of paper itself, from pulp, as devised by the careful Chinese craftmen, was utterly unknown to any part of Europe, we are told, until that 500 years later. This, however, does not discount the fact that Pliny has said (in his Natural History, Chapter 19, Verse 7) that spartum was first brought into Spain from Africa. Carthaginians did it. Hannibal was the gallant commander, and even Livy says Hannibal stored large quantities of it for many purposes. All this happened B.C. 216, before, no doubt, even the Chinese knew about pulp paper.

Persians, in Pergamus, handled much parchment about 200 B.C. They found, in fact, a better way to dress it. Many importers, all over the then known Asiatic and European world, thought Pergamus was the original source of parchment, and thus it was named, as a classification. Papyrus, in Italy, became exceedingly scarce, and Tiberius, about 15, A.D., did not know what to do about it. Sixty-four years manuscripts of papyrus were found there. But the later, in 79, A.D., Herculaneum was taken, and 1,800 Chinese-Arabic version of pulp paper was not then there apparent. Neither Italy nor Greece had ever seen it, and surely Spain was without it, too.

It was in 450, A.D., that Proteaux claimed that card, or card like paper, was in use in the fifth century. Longobards used a bark paper for imperial protocols, as there had been so much dishonesty in the use of forged documents that this was believed to be a secure method of record and protection. Yet no record yet occurs of either Italy or Spain making a native pulp paper production.

Spain, Then, Introduced Paper to Europe

In the year 1007 the plenarium, or inventory, of the treasury of the church of Sandersheim appears to be engrossed upon paper of cotton pulp, and with that date. Other manuscript of A.D. 1049 is in England, also written upon cotton papers. It is in the British Museum, in the famed Bodleian collection, and with that date. One year later, in 1050, A.D., a paper of cotton was used, and now appears in the old Royal Library, in Paris. Still, for all this, the records do not show (nor prove) that either Italy or Spain were then producing the precious paper.

Bringing the Paper to Spain

Moors had evidenty brought to Spain their Arabian heritage of pulp paper knowledge, to Toledo and to Valencia. For, in the A.D. year of 1085 it now seems that the Christians took over the Moorish mills. Instead of using the Moorish raw cotton, the Spaniards now used rags. And the Spaniards used pulp moulds, or cloth screens, permitting the water to easily run off. For this reason the Spanish paper, so produced, was called parchment cloth. Cotton pulp paper was believed to be too brittle, and the finished article soon turned yellow. Mixed rag stock prevented this calamity to government and church records.

But in Italy, or in Sicily, King Roger II objected to cotton paper, too, and ordered his scribes to detail a 1145 A.D. document on parchment. This was a repetition of an original of the year 1100, A.D. It is easily seen that the king believed cotton pulp paper to be less enduring than the parchment. In fact, although a Sicilian paper mill was then operating there about that time (1102, A.D., at least), and the king had granted especial recognition of the manufacturers, he still doubted the efficiency of cotton pulp paper. And cotton, too, was even then a valuable local crop.

About 1120, A.D., Peter the Venerable, abbot of Clum, observed that paper, made from linen rags, was being used in his vicinity. Thirty years later, 1150, A.D., Edrisi says that paper was then made at Xativa, in Valencia, Spain,

Exports of the Spanish paper were regularly sent to both the east and the west. So, perhaps, even Italy received some Spanish paper, in addition to what was made there. Anyhow, the rivalry continued, and each country claimed priority in manufacture, also the prix in paper quality.

Cacim aben Hegi, an Arab scribe, writes that, in 1151, A.D., some very fine cotton pulp paper came from Spain. Mill was located in the aforementioned Xatavia. For it seems the Spaniards, improving upon the Arabic methods of production, and being familiar with water mills, ground the mixed cotton and rags much finer, stamping the pulp into a batch that resembled even the linen product of mills then competing for good business.

Rags, evidently, were used in some quantity along in 1153, A.D. This is mentioned by Petrus Mauritius, who passed away that same year. He wrote, in his "Treatise Against the Jews", the following: "Books we read every day are made of sheep, goat, or calf skin; or of oriental plants, that is, the papyrus of Egypt; or of rags (ex rasauris veterum pannorum)." And that is believed to mean rags made into paper, of fairly modern character, from pulp.

Yet, again, in 1154 to 1166, A.D., notorial archives in Genoa, inscribed by Giovanni Scriba, were written on paper believed to have been imported, likely from somewhere in the Oriental or Near-East area. Some additional specimens of similar paper or pulp issue were found with a 1276 A.D. dating. That was the apparent time of the establishment of the famous Fabriano Italian paper mill.

In the previously mentioned Sicilian production the date 1109 A.D. is also of record. That was a sort of business paper described by Giuseppe La Mantia in the Palermo hall of records. It refers to an order issued by Countess Adelaide, third wife of Roger I of Sicily, about a salt mine around Castro Gionvanni. It is on a sort of white paper, yet no positive proof is offered that this paper was made in either Italy or any part of Europe. It is believed to be the oldest specimen of a European document from pulp paper. It was written in both Greek and Arabic, and is actually understood to be a paper from eastern vessels, bringing such material more or less regularly from Arabian sources.

Carta cuttunea was then currently mentioned, incorrectly believed, later, to mean "cotton paper." But the very fact that the legal papers of Sicily were written upon vellum indicates that the translation was poor, and that cotton paper then had no constitutional standing at all. This is verified by the ordinance: "Ex instrumentis in chartis papiris scriptis nulla omnino probatio assumatur", or "Of instruments written on sheets of paper none is to have any authority". That is final.

In the meantime, though, papyrus was making its last ditch struggle for survival. Eustathius remarks that, in writing upon Homer in 1170, A.D., papyrus had disappeared. Pulp paper was evidently encroaching upon the then known world. Also, Italy and Spain,

Pompeii and Paper are not Synonymous, but Almost Should Be

struggling for commercial supremacy, were using more and more paper, both of cotton and of linen. This is evidenced in 1178, A.D., when a treaty of peace was signed between the kings of Aragon and of Castile. It seems to be the oldest paper of linen used in Spain, according to the date.

Casiri insists that manuscripts, in the Escurial Palace, at Madrid, proved that cotton and hemp paper were inscribed prior to the year 1200, A.D. Even Frederick II, of Germany, appears to have had cotton pulp paper in 1221, A.D. For he said that cotton paper was subject to changes in humidity, to alteration, and to many other visible defects. So he issued a decree stating that no more cotton pulp paper should be used for government documents, and that two years should be allowed to transcribe from pulp paper to parchment all previous legal instruments. And then all cotton pulp paper documents would be null and void.

In the university of Rintlen, in Germany, too, there is a document (or was, as it is unknown what the recent world war damage inflicted on this collection) made from linen rags. It is of the date 1239, A.D., with official seals attached. It is signed by Adolphus, Count of Schaumburg. It is believed to be the most ancient of all linen paper material found in that part of Europe.

Spain, still adverse to using cotton pulp paper, preferred the parchment. Government and religious orders abjured paper. Spaniards commonly called pulp paper "pergamino de pano," freely translated as "cloth parchment." This is in sharp contrast to "pergamino de cureo," or parchment, as the Spaniards called skin parchment "leather," too. Alphonso X, the Wise, king of all Castile, insisted that his State documents be inscribed on parchment, not paper, along in 1265, A.D.

To endorse the understanding that Spain had the first pulp paper is to know that the Arabs, in their water trek from Morocco into Spain, brought with them mechanics and tools to make paper. Two outstanding manuscripts exist on Moorish paper, made in Spain. They are from the Burgos monastery of Santo Domingo of Silos. In a codex of 157 pages, a "Breviarium et Missale Mozarabicum" was written. It is of official note that the number of this document is "43" in a list of the abbey made in the thirteenth century of the "Les Vingt Livres des Etymologies de Saint Isidore," now in the Bibliotheque Nationale of Paris. "Misal toledano de pergamino de trapo," easily translated, in the portion "pergamino de trapo," means "cloth parchment" again. This is of rag paper, cardboard weight, white, in thirty-eight leaves, which is numbered "6" on the monastery list.

Papal Bulls Decreed on Parchment

Both Ferotin and the Reverend Justo Perez de Urbel make mention of these old papers. In analyzing the manuscript, the clergyman endorses the belief of Ferotin that the papers go back to the eleventh century. Some of the liturgical text relates to the mozarabic ceremony of even earlier than 1036, A.D., as that was the year it was finally abolished. So this is believed to be manuscript written upon the very oldest paper of European production. And, also, it is what actually gives Spain the priority in production.

Delisle says that the Silos monastery also had a paper in Latin of visigothic of the twelfth century. Some scholars have it dated from the years 1090 to 1120, A.D. It contains 223 pages, with alternate sheets of paper and of parchment. Evidently, the monks feared to trust mere paper. They still possessed the idea that paper was transitory, and of use only for occasional correspondence, temporary accounting.

As previously mentioned, the travels of Peter the Venerable took him from Cluny, around 1092 to 1156, to Saint James of Compostella, in Spain. There he says he saw books written on "modern" paper, made by local Jews. Copies of the Talmud were so manufactured. In Latin he said that "These books were made of rags, or from some other more vile material." But the phrases used, in translation, appear to be of several distinct meanings. Maffei says "rasuris pannorum" means "cotton paper." Tiraboschi says it is "woolen rags." Huillard-Breholles reports it as "pieces of skin." But, evidently, what was meant is "used rags." Scholars are confused by the multiplicity of claims and of evil translations. So they still say, many of them, that paper from pulp did not arrive in Europe until the thirteenth century.

But Joinville wrote St. Louis in France about 1270 on paper which must have been dispatched previous to Louis' passing in that year of 1270, A.D. Montfaucon reports, however, that he could find no authentic paper from pulp, made in Europe, either from Italy or Sprain, previous to 1270, A.D. Yet, again, along in 1290, there was said to have been a paper mill constructed at "Ravensburg," later Regensburg and Ratisbon. Barrios denies that pulp paper was made in Europe previous to the start of the fourteenth century. Perhaps this refers to the year 1308. A.D., when Meerman says linen paper was *used* in Germany then, but not that it was *made* there. In fact, the

Paper as British as the Horse Guards

Germans, growing flax, may have made their pulp of that material, at the time.

At Nuremburg, the toy town, Germans had linen paper, evidently around 1319, A.D. But whether or not it was made in the vicinity is not known. Von Murr merely reports the incident of its use. Still, while this was going on across the Germanic border, Spain was apparently making much pulp paper from hemp and from flax, additioned by rags. Flax was produced, in quantity, around Xativa, or Jativa, and the Moors had used it freely. They had the native limestone water for fluid. Kings of Aragon sustained the previous Arabic laws for the protection of the paper industry. As early as 1238, A.D., King Jaime I, defeating the Arabs, and retaking the kingdom of Valencia, said the Jewish workmen and proprietors in paper would have his protection—and he taxed them, tremendously, for that same protection.

At Barcelona, Spain, Jaime I issued one of his famed decrees, stating under date of February 8, 1273, that "Royal taxes, laid upon the Jews, who make paper in Xativa, give and concede to you, of the Moorish community, Aljama, of Saracens at Xativa, and to yours in perpetuity, that, with respect to paper, which will be made from now on in Xativa, neither you nor yours shall be obiged to give, nor shall you give to us or ours any dues, *except* only three royal Valencia deniers on each ream of the same."

Peter II of Aragon, in 1338, A.D., even advised the Xativa manufacturers to return their production to a more popular size of paper. For three hundred years the mechanical and technical development of paper was thus in the hands of the Jewish manufacturers of this illustrious paper district of Valencia. Some of their paper, in museum collections today, resembles the type of modern stock in this country. Other European countries, inclusive of Italy, Germany, and even of France, may have had isolated mills and production, but it was, indeed, the mills of Spain which gave forth the largest output, and of the better quality.

In England, too, about 1320,A.D., the earliest manuscript on linen stock was of the fourteenth year of the reign of Edward III. And the London Society of Antiquaries, searching for the fact in 1330, could discover no water marks on paper specimens of the twenty-eight previous years. Therefore, it was believed that all paper used in England, to that period, was of imported stock. Hunter, the researchist, finally found a ram's head mark on some paper of the Constable of Bordeaux.

France, eager to repeat the performance of its neighbor, Spain, planned a mill for paper at Lodeve. That was in 1189, A.D., But the claim nor actual plant was never substantiated. Imports were evidently made from Spain, when possible. Both Perpignan and Narbonne exchanged merchandise with Spain, and their imports of Spanish paper may have been the source of the earlier claim of a French mill.

Italy, also, may have been shipping paper to France. For mills in Italy, making more paper than local sources could possibly use, exported vast quantities in every direction. After the establishment of the Fabriano mill about 1268, A.D., other Italian mills sprang up at Bologna in 1293, in Cividale, in Padua, in Genoa. Fabriano mills used superior technical skill and remarkable mechanical enterprise for the period. Their completed stock equalled that of the experienced Moors and Spaniards. For they used metal beaters, sizing the pulp with gelatine, making the first fibre more minute, and being so proud of the finished product that they placed their first water mark upon the paper. In fact, superior pulp stock was claimed for the

France was Noted for Beautiful Paper

Belgians Made Fine Paper, Too

Fabriano paper. But modern botanists have exploded this theory with their microscopes. Difference was that the Arabic Moors had used crude hand pestles to beat the stock. Their fibers were coarse, long. Their sizing was of starch. Even the first paper of the Spaniards was not of required quality. This is proven by the fact that the aforementioned Peter II ordered the Xativa manufacturers to either resume the production of better paper, else go out of business.

Flax and hemp were still the major portions of both Italian and Spanish paper. They used no cotton, according to modern analysts. Scholars, too, have been much mixed about the relative uses of cotton, linen, rags, hemp, flax, even of shreds of silk, in various papers of the period.

About the fourteenth century, however, France really went rather heavily into paper production. In 1348, A.D., a mill in the St. Julien sector, at Troyes, was established. John II, the Good, presented letters patent to mills at both Troyes and at Essonnes. And on record in 1357, A.D., is a contract between St. Pierre and a paper maker named Colins, "To rent a paper mill, and that he should not change the paper mill to any other kind of a mill." Toiles discussed a mill in 1388, and even in 1376 a mill evidently existed at St. Cloud. Peignot mentions these mills.

In Germany, a paper man named Stromer was having labor difficulty with his Italian mechanics at Nuremburg. These Italian craftsmen said Stomer stole their trade secrets. Stromer said he started to make paper there in 1390, writing the report in his personal diary. Labor at law was apparent, even then. For Stromer's two mechanics filed suit and quit. So Stromer eventually leased his three wheel mill for four years to one of his workmen.

It was for finding linen paper of the date of 1342, A.D., however, that the Royal Society of Gottingen gave John Daniel Fladd a prize worth twenty-five ducats, in a medal. But this is not conclusive as earlier specimens have now been located in numerous museums and collections.

Flanders turned its attention to paper mills in 1405. Jean l'Espagnol set up the first plant at Huy, in that year. But paper was still too expensive. Eastern paper, from the Orient, had been low in cost, but the more expensive labor and materials of the west enhanced the cost and ultimate price of paper in Europe. Countess Mahaut d'Artois left accounts showing the excessive cost of paper. So did inventories of the Duke of Burgundy. In England, also, the price was high. In 1359 to 1360 two quires of paper cost 18 deniers. Charles VI had an account showing eight to twelve sous for paper at Panneterie, in France. Rags ultimately cut the cost of papers. Even the then prevailing fashion for individual wear of linen, instead of woolen, under garments helped the paper makers. Their campaigns for cheap rags were numerous. An old invoice in England shows that a certain George Cosyn paid tenpence for one quarter of royal paper to make painters' patterns, along in 1352.

Austria soon made paper. Its first mill was evidently started at Leesdorf, near Baden, in 1356. It was, thereafter, a famous area for the manufacture of paper machinery. In fact, the first crude semi-hand machines were gradually making their appearance in various parts of Europe. From the origin of the first Fabriano metal beaters, inducing a reduction in the cost of paper, the same sort of labor and money saving was evident in many other sections.

Italy was selling paper in 1382 at two livres, five sous a ream. This made a dozen sheets of paper cost only as much as one parchment skin, thereby eliminating parchment as a competitor. Italy tried to prevent the export of flax, hemp, and rags. Senate of Venice in 1366 protected the mills of Treviso with the provision that Venetian rags should go nowhere else but to Treviso for the paper mills. This was also so in 1374, as a letter of that year, dated July 27, said

To Poland and to Germany Went Paper Progress

As Dutch as the Fabled Wind Mill

that the regulations about rags are thus confirmed. Paper stock was still a problem in Italy, and elsewhere, even in the fifteenth century. From 1401 to 1424 some especial regulations were issued by the governing authorities. For instance, at Genoa, the French Marshal Boucicaut, governor under authority of the king of France, and the governor for the Duke of Milan, got together to arrange a concession to a dealer named Damiani for the exclusive privilege of collecting refuse cordage, or hemp, in Genoa. And they worded the concession this way: "Whoever does not belong to the said trade (of dealers in old rags, hemp) is forbidden to sell used linen and old cordage; any one not belonging to that trade is forbidden to buy used linen and old cordage for resale in the city of Genoa, under penalty of a fine of four florins for each offense." Which was a sort of early N.R.A., it would appear.

Then the paper makers reached forth. They objected to this monopoly of the rag and cordage dealers. For they had to buy, at the ragpickers' prices, enough material for the production of local paper. And the Council of Elders immediately adopted two amendments to the original ordinance. First of these tried to prevent the theft of cordage, which was frequent, and the other was exceptional permission to the paper makers to buy cordage and rags in or out of Genoa, and to sell it to whom they pleased, even to competitors. This, likewise, was a sort of a blow to O.P.A., of that day and date. All this was included in an act of the Doge of Genoa of April 16, 1481.

In France, even up to 1376, some exclusives still wrote their messages on waxen tablets, said Du Cange. But mills were being established, too, at Colle, in Tuscany, powered by water in 1400 A.D. Some copies of the Bible, printed by Gutenberg in 1450 on parchment, were discovered in Paris. Other copies came to light in Berlin, Brunswick, and at St. Blaise monastery. Scholars believe these to be the first printed Bibles, instead of the famous Mazarine in two volumes, and not on paper stock at all.

Greek paper makers were not idle, however. They fled to Switzerland, after the fall of Constantinople in 1453. There they created the first paper mill at Balse. But other authorities report that the mill wasn't actually built until 1470. No one knows, precisely, just when the first Swiss mill was constructed. But the Swiss made early paper, likely in this fifteenth century, and, perhaps, a bit in the fourteenth.

At Rome, the Pope received protests in 1471 that Sweynheim & Pannartz, in the printing business, had so many books on hand (12,475 copies) that they required the Pontiff's assistance in their dispersal and sale. They also stated that no one would ever know where they acquired so much in rags to make all this paper for the books. About 1,250 reams of book paper was thus indicated, as a passing note.

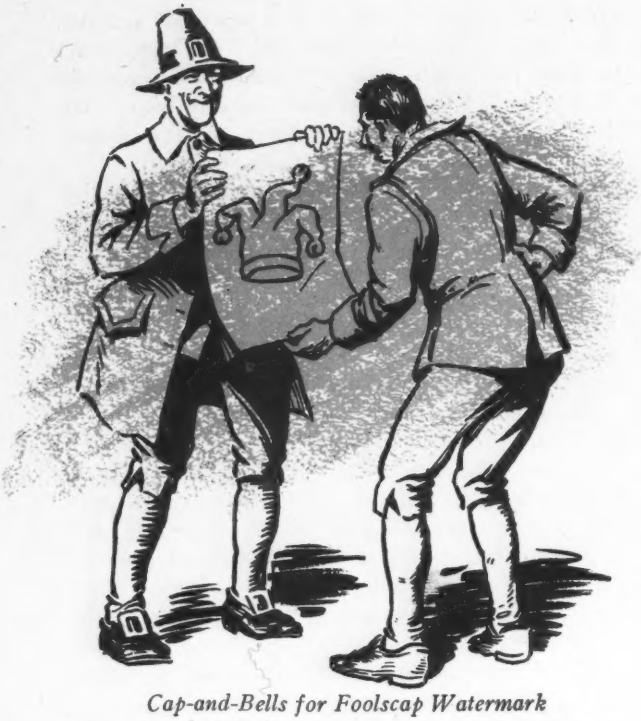
Along in 1498 an entry was made in the accounts of Henry VII, saying: "For a rewarde yeven at the paper mylne, 16s., 8d." That makes it appear a mill existed in England, prior to the original Spilman mill by almost fifty years.

And in that same year Wynken de Worde wrote:

"And John Tate the younger Joye mote he broke,
Whiche late hathe in England doo make this paper thynne,
That now in our englyssh this book is prynted Inne."

This makes it appear, also, that Tate was making paper in that year, for the mill was said to have

Czars of Russia Sought Paper Makers in Europe



Cap-and-Bells for Foolscap Watermark

been at Hartford. And he used a water mark of an eight pointed star in a double circle. Print of that eists in Herbert's Typographical Antiquities, volume 1, page 200. Tate died in 1514, A.D.

Hand paper, so called in England, probably came from the trademark of a hand with a star at the end of the fingers. Jugs and pots were also used as trade or water marks. Pot paper was thus named in 1539. Fool's cap (and bells) came somewhat later, making way for a water mark, more appropriately, of Brittania. Henry VIII, angry with the Pope, used a mark of a hog with a mitre. That was about 1540, when religious extremists were rampant.

Paper was so scarce in France, about 1552, that Henry II endeavored to promote its manufacture by remitting all taxes to the makers. Taxes in France then were extremely heavy, and this exemption to the paper trade was, indeed, a complete concession. Whether or not it immediately increased production is not recorded. But Charles IX put the taxes back again in 1564. This induced the French University to bring the subject of paper taxation before the Parliament. Both Montholon and De Thou insistently spoke for the complete abolition of the tax, and the University won its case, wiping out, once more, this disliked excise.

Spilman,' who was first credited with the earliest paper mill in England, was again mentioned in 1558. But this is questioned by the previous notation of the Tate mill in 1498, with Tate's passing some sixteen years later. So Spillman either had a previous mill, or else the record is false. Another record says that a mill existed in 1562 at Fen Ditton, very close to old Cambridge, and the University. Nicholas, writing in 1588 on "Progresses of Queen Elizabeth", notes a poem on paper and of a paper mill near Darthforth. This, he said, was operated by "A high Germaine, called Master Spilman, jeweller to the Queen's Majestie". So Spilman's mill, from the dating, must have been secondary to that of Tate's. Original spelling of Spilman's name, "Spielman," in the German, was also confusing. Spilman eventually was made a knight by the Queen, because of his paper.

Land revenue records of 1591, in England, mention lease of a water mill for paper in Fenclifton, County Cambridge, late bishopric of Ely, to one John George. This was quaintly dated "14th July, 34th Eliz." It is concrete evidence of the third English mill, no doubt.

In France, again, Louis XIII put back the tax on paper in 1635. Paper for so-called "hanging paper", or wall paper, came along in 1640 to replace the more expensive tapestries, in cloth. Wall paper became most artistic, and of great pride to both makers and buyers.

In 1646 a Jesuit named Athanasius Kircher had paper made of asbestos. In fact, from all accounts, various parts of Europe were producing paper made from all kinds of odd material. Experiments were continuous. Spanish, Italian, French, German, English manufacturers were sharply competing for the business of the continent. Exports were being freely made, where possible, to all the world.

Fine English paper had a royal arms water mark. This was about 1649, when contempt for the king, Charles I, brought forth the famous fool's cap, as a substitution for the arms of the king. Parliament ordered this size for its permanent records. And this odd water mark is deeply imprinted, even now, in the laws of the land. But it is now recognized as a type and size of paper, rather than as a distinctive quality.

Sweden was anxious to improve its paper and printing situation. So, in 1652, Christina urged a Dutch printer, Jansens, to come to Sweden and import his paper, duty free. Even Louis XIV, in France, in 1654, saw the necessity of bettering his paper situation. So he forwith changed the tax to an exemption from duty for thirty thousand reams, of every quality and material. Control of this favor was placed in the hands of the State University. Some eight mills made paper in just one district of France in 1655. That was around the Angouleme area for six leagues.

At this time (around 1658) the French paper makers were easily becoming the superior producers of the then established paper world. More than two million of livres in paper were exported to Holland alone. Even Spain, England, Switzerland, Denmark, Sweden, Russia recognized this quality of material of the French, and so bought. But Holland remained the first customer, with the Near-East the second largest buyer. Thus, to the Levant, did paper from

Europe again flow, and to the secondary sources of the original production.

In a remarkable work on paper, Fuller, writing in 1661, says paper had taken on the qualities of its numerous origins. For example, the Venetian paper was subtle, neat, courtly. French paper was believed to be light, slight, slender, thin. While the Dutch made paper that was thick, corpulent, heavy. England, Fuller thought, was buying too much paper abroad, and not encouraging its own paper industry.

England's bill for imported paper from Holland alone, in 1663, was around £100,000. England had created many types of neat writing paper, one of which was the post-horn variety. This was called "post". Its water mark was thus indicated. It evidently came along, more popularly, when the general post-office was established. Habit of blowing the post-horn at taverns, post-offices, and such, indicated the origin of the paper type and mark. France also supplied a great bulk of English paper in 1670.

To indicate the growing sense of necessity of promoting English made paper, a book, in 1678, had this odd advertisement: "To the king's most excellent majesty, this book is humbly presented, being printed upon English paper, and made within five miles of Windsor, by Eustace Burneby, Esquire, who was the first Englishman that brought it into England; attested by Henry Million, who was overseer in the making of this royal manufacture."

It is more or less reliably stated that the first mill in Holland was not erected untill 1685. But the mere fact that the Hollanders were previously such large dealers and exporters of paper disproves this date. Paper makers were fleeing from France, with other refugees, in those days. And many of them, although intending to go to England, even to America, found asylum in Holland. So it is easily supposed that Dutch paper mills must have been in operation in Holland prior to the above date. French paper workers, in fact, were superior workmen. They took exceptional pride in their jobs. When a proclamation for the establishment of a *white* paper mill occured in England in 1687, many French paper workers responded. Only brown paper had been made in England previous to the revolution of Cromwell. In 1689, for a fact, paper became so expensive that Englishmen stopped buying it. Even printing ceased, to a great extent. Hugenots, from France, made fine white paper in

Hollanders Used Wind Mills for Power

England along in 1690. Wars and rumors of wars, had occasioned a tremendous upheaval in all business, paper not excepted.

Many excellent paper makers were slowly emigrating to America. In 1690 the sailing of William Rittinghuysen, from Broich, Holland, was notable. His name was also spelled as Rittenhouse, as that was more appropriately American, or English. As these experienced paper workers made effort to get to countries where their work would be handsomely appreciated, with greater remuneration, they hoped, some went, also to Scotland. A mill for paper was opened there in 1695 for the production of white fine quality stock. In the British Museum, today, there are articles of agreement, establishing this mill in the Highlands.

In 1696 Parliament was considering a bill to levy 20% on all foreign paper, according to the "Case of the Paper Traders," also in the British Museum. This heavy assessment was to include parchment, vellum, pasteboard. Another 20% was proposed as a tax on even home made paper in England. And it was estimated that there were then less than one hundred paper mills in all of England. Only about £28,000 was represented in domestic productive paper value. Paper workers were poor men, and they objected they could hardly maintain families.

Naturalist Reaumur Thought of Wasps Making Paper

It was about 1700 that Belgium had its first paper mill. Government aid was sought and obtained for it. But it struggled along rather sadly during the eighteenth century. Yet, on the other hand, fully four hundred paper mills existed in just two provinces of France, Perigord and Angoumois. But England was improving its paper. So was Holland. Therefore, about three-fourths of the French mills were obliged to close, what with loss of trade, high duties and taxes, plus the many mixed wars, with contending navies sinking numerous cargoes, capturing others for the high compensation on enemy shipments and ships, too.

Even publications in England came under Parliamentary tax in 1701. Only 20,000 annual reams were used in the printing of these low cost books and publications. But the demands of the crown were insistent. As in all wars, the costs of actual combat were only exceeded by the waste and extravagance of government at home. Unknown sums of gold were going into these almost private contests of the kings of Europe. And paper had to pay its excessive share of the expense.

Queen Anne, in 1711, put some duties on paper to carry on her wars, some with the American Indians. Even the colonists, in America, were expected to help with men and with money, of course. So paper, a necessity, yet a very handy item to tax, had to bear its proportionate assessment once more. This Queen Anne tax on paper was called the "first" on the industry. But it is evident that many other taxes were silently or more or less quietly attached, at various previous periods.

In 1712, when Peter the Great, of Russia, got around to a visit at Dresden, he was astonished with the efficiency of paper production there. So he hired some Germans to proceed to Russia to make paper at Moscow. This was evidently the first mill for paper to be created in all of Russia, notwithstanding its long acquaintance with paper production on its southern and eastern borders, with both Chinese and Arabic contacts.

Meantime, in England, again, where the paper business had practically gone to pieces during the wars, and with taxation, Thomas Watkin, in 1713, brought some semblance of organization back through his acquaintance with the stationery trade, in which he was profitably engaged. Three years later, in 1716, John Bagford, an early paper technician, died. He

---

(Picture, Opposite Page—)
(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Royalty Demands Its Pittance

An English broadside proclamation, dated 1694, relating to the various revenue stamps to be used on vellum, parchment and paper. The Paper Museum has a goodly collection of material of this nature that has been gathered in Europe during thirty-five years.

By the King and Queen,

A PROCLAMATION

For Publishing the several Marks or Stamps to be used for Velum, Parchment and Paper, pursuant to a late Act of Parliament for Charging certain Duties thereupon.

MARIE R.

God save King William and Queen Mary.

London, Printed by *Charles Bill*; and the Executrix of *Thomas Newcomb*, deceas'd; Printers to the King and Queens most Excellent Majesties. M DC XC IV.

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Nature's Own Paper Maker—A Wasp's Nest

was credited with being an expert in paper knowledge to the extent he could, by sight and by feel, indicate the worth and where a paper originated, even though the stock may have been quite antique. He wrote much on paper production, and some of this material is now in the British Museum. It is catalogued at "5891" to "5988."

Curious fact is that, although paper had evidently been made from quite all original sources, even bark of bushes and trees, the first practical suggestion of the use of wood in production appears to have been made by Reaumur. This was in 1719. Reaumur went back to the original wasp for his idea, and played this up as a suggestion, but failed to carry it out, himself. This man, and his idea, have been used in frequent song and story (plus the necessary advertising) to tell of the origin of modern paper production with wood.

Spain, about this time (1720) regained the privileges of production originally granted to the convents and monasteries. But, as the business again returned to individuals, the bottom seems to have fallen out of the Spanish paper industry. Printed books could be bought for almost nothing at all. Paper was so cheap (and sometimes so inferior) that merchants from Genoa came along and bought up Andalusian rags and paper stock. This they made into paper for Spain, reselling the same for around 500,000 piasters.

In England the production of paper reached 300,000 reams in 1721. This was easily two-thirds of all Great Britain was using at the time. So the English were rapidly becoming self sustaining once more, and with better quality merchandise. But the Dutch were in somewhat of a reverse position. Their mills were few, and, in 1723, they imported much of the fine French paper. Fact is, the Dutch, struggling with many economic problems, were at an extreme disadvantage in paper, and they realized it, with sorrow. Great Britain stepped its annual production up to £780,000 in 1723, shipping quite a bit to customers abroad.

Again the Germans were trying to make paper from asbestos, like Father Kircher's in 1646. In 1727, Dr. Brueckmann, a naturalist, attempted to prove that the feat was practical. So he published a book composed of asbestos stock, in connection with his work on geology. But only four copies of the book were so printed. Seba, also writing in 1734, stated that trees should be used for paper. He was writing a work on natural history, and included some suggestions of what he thought fitting for the purpose.

Progressive England went ahead with production. This time in 1746. Because a family of Potters built a great textile mill at Manchester, with some new machinery that ran off eight to ten thousand rolls daily on eight machines, a forerunner of the paper machine. One machine printed with four colors at a time, a radical departure from previous production. In fact, they produced more goods than all the mills in the London area combined.

Rouen, in France, had a bad period about 1748. Exports of French paper were steadily decreasing. Production in other countries, plus taxation, was ruining the paper industry of the French. Mills at Rouen closed up. People were out of work. Practical paper makers did not know what to do. This was but a part of the effect of bad times on the French, brought upon themselves by over-taxation from too many wars.

Holland made great strides in 1750 when inventors there produced the cylinder method of turning rags into pulp. Few paper men abroad paid much attention to this innovation at the time. And the same year Baskerville introduced woven moulds, to obviate the crude roughness of ordinary laid paper. He, in fact, then produced a wonderful copy of Virgil on this newly woven stock. Even Guettard, in France, told of his recent experiments in 1751 about how many vegetables, bark, leaves, wood, and so on, could quite easily be converted into pulp paper.

And workmen from Holland, brought into Austria by Maria Theresa in 1754, instructed the Austrian master paper makers on how to improve their methods. She also abolished the previous monopoly on rag buying.

Two years later, in 1756, William Hutton opened the first paper warehouse in Manchester. And the same year attempts were seriously made to make the first straw paper in Germany. Rags were so scarce there that something had to be done about it, and this was immediately suggested by the profusion of straw. Three years later (1759) James Whatman made the

(Picture, Opposite Page—)
(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Seba, the Naturalist

Albert Seba (1665-1736), a Flemish writer on natural history, who recommended the use of "Alga Morina," a sort of seaweed, as a material from which to make paper, in lieu of linen and cotton.

ALBERTVS SEBA, ETZELA OOSTFRISIVS
Pharmacopoeus Amſtelaedamenſis
ACAD: CAESAR: LEOPOLDINO CAROLINAE NAT: CVRIOS: COLLEGA XENOCRATES DICTVS,
SOCIET: REG: ANGLICANAE. et ACAD: SCIENTIAR: BONONIENSIS INSTITVTVS SODALIS.
AETATIS LXVI. ANNO CIↃIↃCCXXXII.

His Wife Accidentally Dropped Bluing in Pulp Batch

reputation in paper perfection that finally obtained for his plant the award at Maidstone. He had investigated the principal mills of all Europe, noting their individual and collective improvements and methods.

At Ratisbon, Germany, in 1765, Jacob Christian Schaeffer wrote that many native materials should go into pulp. Germany's shortage of rags probably prompted the writing and suggestions. Among the materials he mentioned were moss, sawdust, beech, willow, aspen, mulberry, pine, hop vines, barley straw, cabbage stumps, thistle stalks, burdock, wheat straw, broom corn, and peat.

Demarets went to Holland in 1768 to study pulp and paper procedures for French manufacturers. French Academy of Sciences, in Paris, believed Demarets could do the job best by making note of all the Hollanders had accomplished in recent years. Eleven mills in Holland used wind to drive grinding and cutting engines. This method, using their characteristic wind mills, was so much faster than hand labor, in either France or Germany, that a wind mill could do more work in an hour than hand labor could accomplish in six hours. In Saardam alone, 1,000 workers were employed in 1770 for paper production. Fully nine-tenths of the pulp stock had to be imported, yet Holland was able to export large quantities of the more rapidly finished paper to other countries.

Maize was also used for pulp about 1772 in Italy. This maize was also known as Turkish wheat. It is believed, however, that this was merely an experiment, and that it accomplished no permanent purpose. But the same year a German book contained sixty samples of paper made from various pulps. Schaeffer again wrote the details, and our Smithsonian Institute, in Washington, has a copy of the work. Two years later, in 1774, Scheele discovered chlorine, used with lime, to bleach paper.

Linden bark was used to make white paper in France. This is also known as basswood. Twenty specimens of paper from this bark were contained in a book on the subject of vegetation for pulp. These samples were of extremely poor quality, and it is not believed that the ultimate purpose of pulp production was at all forwarded by this work, which appeared in our own Revolutionary year of independence, 1776. A year later, in 1777, another French delegation went to Holland to look over the fine paper situation. And, in 1779, Didot, the French printer-paper man, analyzed English vellum paper. He urged Johannot d'Annonay, a French paper mill owner, to make similar paper which was at last accomplished with much acclaim.

Scotland, too, was making paper progress. That same year, 1779, ten paper mills were operating in Edwardsburg, otherwise Edinburgh and its immediate area. But nearby Sweden was struggling with its paper problem. It had only two dozen paper mills in all the kingdom, even up to the year 1800. In 1781 it was importing 18,579 reams of paper of all descriptions. Across the North Sea, at Hamburg, 80,000 reams were being imported a year later, in 1782. There were then only two paper mills in Hamburg. They had just two vats, each. And they used 60,000 pounds of rag stock in making an inferior dark purplish paper for bakers.

Meantime, England was going ahead again in production. Some £800,000 of paper was manufactured there in 1784. Taxes paid on this production totaled £46,868. Russia, too, claimed an increasing production. But the figures of Count Ewald von Hartzberg, of 800 mills there, were believed to be ridiculous in 1785, with a stated annual revenue of $200,000. Even Germany claimed 400 mills in the same year. Output was then said to be 20,000 paper bales of ten reams, each, every year.

So called marsh mallow paper appeared in London in 1786. This was used in a book of the French Marquis de Villette. Specimens of other paper in the book also included: nettle, hop, moss, reed, conferva, couch grass, spindle tree, wayfaring tree, elm, lime, yellow willow, sallow willow, poplar, oak, burdock, coltsfoot, thistle. A paper mill man named Leorier, at Bruges, made the samples. But, as usual, they turned out to be samples, rather than production. A year later the French Government removed the duty on French wall paper because production had increased so largely from sales made in the United States, a new customer.

That same year, 1787, a patent was granted to an inventor, Samuel Hooper, because he had devised a copperplate printing paper of superior quality. And the next year, 1788, another experimenter, Greaves, of Warrington, also in England, made paper pulp from bark and leaves of willow twigs.

(Picture, Opposite Page —)
Indeed a Paper Pioneer

One of the four original portraits of Dr. Jacob Christian Schaeffer (1718-90), in the Paper Museum. Dr. Schaeffer was the first scientist to actually make paper of wood, straw, corn-husks, hop vines, potatoes, barks, and other vegetation. Between the years 1765 and 1772 he compiled his six-volume work, in which he included specimens of paper which he had himself made from more than eighty varieties of vegetation. Dr. Schaeffer was the pioneer in using papermaking materials other than linen, cotton, and hemp.

IACOBVS CHRISTIANVS SCHAEFFERVS
ECCLESIAE RATISPONENSIS EVANGELICAE MINISTER
NATVS QVERFVRTI D. XXXI. MAII A. MDCCXIIX
IN SACRVM ORDINEM R.C. D. IV. IVL. A. MDCCXLI.
BENATVS D. AETAT.

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Society for the Encouragement of Arts and Manufactures presented a silver medal to an English paper mill for making 44 quires of paper from the bark of the previously mentioned sallow tree. It took 600 pounds of material to make the paper of that quantity. One year later, in 1789, there were 600 men employed in paper production at Angouleme. They made about 1,400,000 pounds of paper annually with crude hand mallets. Such paper sold for ten cents the pound. That same year Ouvard, son of a French paper dealer, foresaw the value of paper in the French Revolution. So he contracted for just about all the paper he could get at Poitou and Angoumois for the next two years. On this deal Ouvard made 100,000 crowns. It took just about all the French mill men and their wives and children to make this sort of hand made paper. Owners of mills worked diligently beside their workmen. Hand labor was responsible for this, as very little machinery, of any sort, was then known to France for paper production. To either help, or to hinder, production, the French Government, in 1790, tried to stop the evident monopoly in paper. So a legislative act fixed the price of all merchandise, inclusive of paper. And all the mills immediately ceased production.

This was the year, too, 1790, that an odd accident started the manufacture of blued paper. A mill owner's wife, in England, had accidentally dropped a bag of laundry bluing in the pulp batch at her husband's mill. Both mill owner and his wife were immediately astonished by the improvement in the pulp. Blue paper sold for an advance of four shillings the bundle. And Samuel Hooper, again, made paper from leather cuttings and refuse paper.

In Germany, that same year, 1790, printing had advanced so rapidly that paper makers were beset to supply sufficient stock. Rags were very scarce, indeed, also. So the paper mills merely reduced the quality of the production, cutting the material thinner. Printing became almost impossible to read legibly.

An inventor in England named Campbell bleached rags successfully with a patented method similar to that used in bleaching cotton thread. That was in 1792, and another inventor, named Cunningham, of Edinburgh, received letters patent the same year for improving the manufacture of paper. Still another inventor, John Biggs, obtained a bleaching patent with the use of manganese and simple sea salt. That was in 1795, and, a year later, in 1796, a man named Bidds made paper from sawdust of sapwood for printing paper.

So we enter the idealistic and practical machine age. At least, along in 1798, and running through to the early 1800's, the first evidences of pioneering paper machines, on a larger scale, appeared. From France, thence to England, this early and crude model traveled. Its ups and downs were largely one way — down. Neither paper mill owners nor financiers were anxious to capitalize this magnificent idea. Like all such plans, they went amiss. Inventors, anxious to perfect their ideas, made progress with their models. Improvement upon improvement rapidly followed in these closing days of the eighteenth and early days of the nineteenth centuries. Yet the practical development of paper making machines was slow, indeed. So slow, in fact, that the first inventors and their backers lost practically everything they put into the machines — their clever thinking, their time, their money. Still, the paper machine was overdue. It was necessary and wanted to fulfill production. And it was to come into its own as the nineteenth century supplied that progressiveness in all machinery and equipment which has made it so remarkably notable over the years.

CHAPTER III

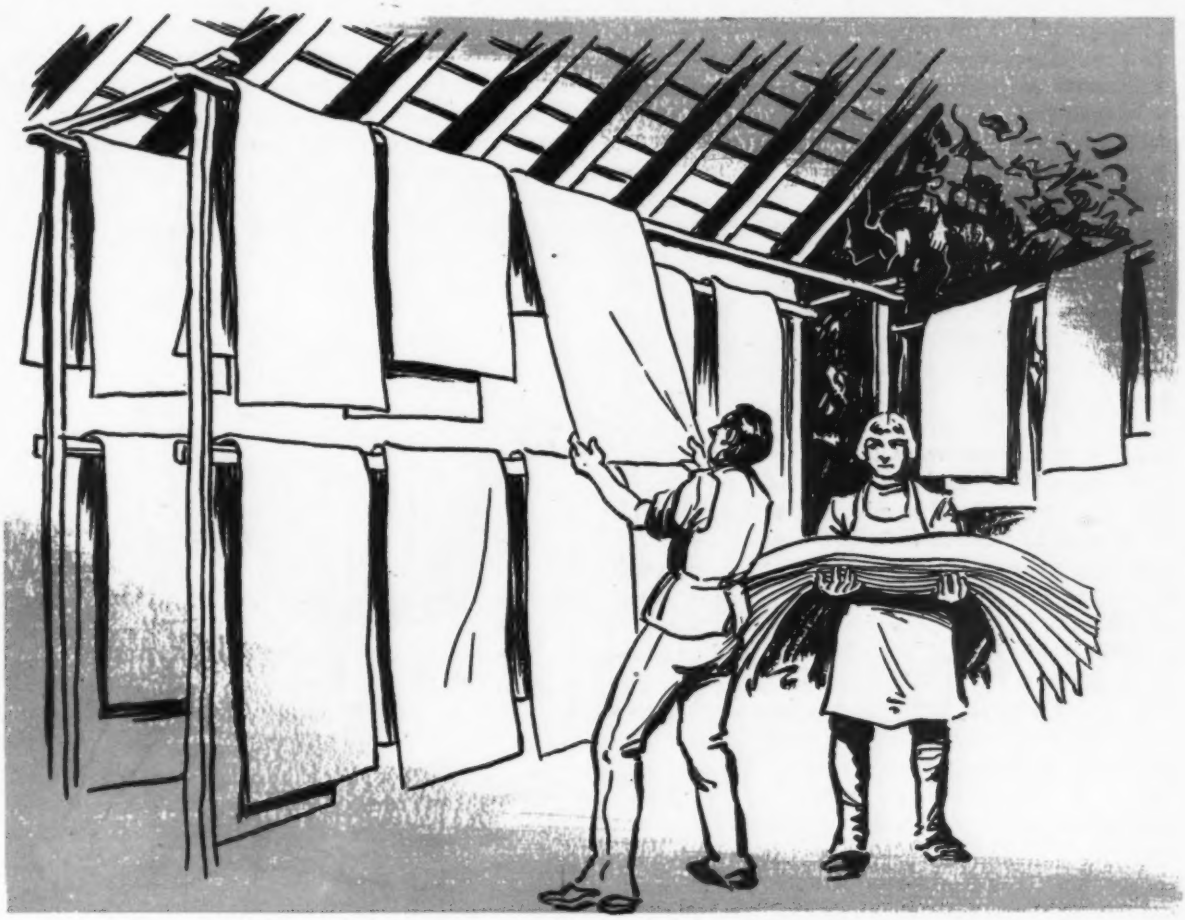
Era of Invention Arrives With Paper Machines in Europe

THIS era of invention appeared to be contagious. Not only in England, but in America, too. Also in France. And it was in France that the event had occurred in 1798 which was to revolutionize all paper production. For a ED: supply ??? Louis Robert was employed by Francois Didot, at the Essonne mill. This man Robert, experimenting for months, devised the machine which could make paper in sheets twelve by fifty feet. That was unheard of, at the time, and was the forerunner of the famous Fourdrinier machine, used to this day by mills everywhere.

Largest mill in France was at Montargis. This mill had thirty vats. It required 1,620,000 pounds of rags annually, 135,000 pounds of sizing. Still another at Vouget had twenty vats, twelve engines. Each engine really required a vat with hand work. In 1799, therefore, it is readily seen that the approach of the new Robert machine would be remarkable, indeed.

That year, also, in 1799, England paid £140,000 duty on paper for home use. Rags from the continent, that year, totaled 7,307,117 pounds. Another 17,000,000 pounds of rag stock had to be found at home. In all, this 24,000,000 pounds of rags made sufficient paper for England's increasing needs. But England, too, had immediate need for the Robert invention. Robert's patent, in France, was awarded that same year, 1799.

Attempts were still being made, however, to make paper of something other than rags. Marquis of Salisbury gave the king of England a book printed from straw paper. This was in 1800, and the book contained account of the methods used in pre-historic times to record events before the day of papyrus, parchment, vellum, or



Machinery Came, Yet Paper Was Still Dried by Hand in Ye Olde Mill Lofts

Marquis of Salisbury Presents Specimen Paper Book to King George IV

paper. Burton, of London, also had a similar work. He likewise used a straw paper. Duty on English paper rose that year, 1800, to £315,802 for home use.

But Louis Robert had successfully demonstrated his almost endless paper machine. So the French Government accordingly awarded Robert 8,000 francs, and a patent good for fifteen years. Revolution in France, however, entirely upset the proposition for production of the machine. So the work was sent over to England to be completed. English capital and English mechanical skill were both required to finish the machine. Also, to put the Robert invention into use on a large scale necessary for its universal success. This was at the start of the century in 1800.

Another inventor, Matthias Koops, in that same year, 1800, used old waste paper, even that which had previously been printed upon, to make 700 reams of a fairly clean and white paper. This was also a forerunner of an important recovery of formerly waste paper.

Russia, progressing more slowly, had a mill at Jaraslow with 28 engines and 70 vats. This mill made 1,100 reams weekly in 1800. It also used 800 tons of rags every year. Another mill, at the time, used 13 engines and 13 vats for wall paper alone. This fancy paper was consumed in Moscow. And Spain reported nearly 200 mills that same year. Thirty-one of these were located at Alcoi. Francisco Guarro made paper in Spain which, he said, was similar to, and as good as, that made in Holland.

It was in 1801 in France that an inventor named Seguin received a patent on paper made from straw, hemp, and even vegetables. Paper mills found the Seguin methods expensive, however, so abandoned the process. But John Gamble, the Englishman, went ahead with the Louis Robert patent. He went from France to England with Didot, of Paris, and obtained the first patent in England for the Robert-Didot machine. Didot was to pay Robert 25,000 francs for the patent of what was to be this famous Fourdrinier machine. This payment included the model.

That same year, 1801, only twenty-six mills were operating in Russia. There were plenty of Russian rags (when haven't there been), minus export, yet the Russians imported 220,000 rubles in paper from abroad. Germany had more mills, at that time. Fully 500 were in operation. They made 2,500,000 pounds of paper every year. This was only in a very coarse stock, as the better grades of paper were still imported.

France, also, had about 500 mills in 1801. Exports of paper had largely decreased. Some 20,000,000 pounds of rags were consumed in France, at the time. Still, there remained 14,000,000 pounds of rags for export. This was prohibited, but smugglers managed to get the stuff out of the country—or into it.

For forty-five years an Englishman named Robert Bage had made excellent book paper, for printing. And William Hutton, bookseller and author of Birmingham, had been buying that paper of Bage. It was nearly the entire Bage output. And, in 1801, Bage died, leaving Hutton without a mill supply.

Patents continued to proceed from England and from France, largely. In England, in 1802, W. Plees received a patent for coloring pulp. Plees mixed pulp with snuff, hay, or any substance required to make a certain color. Burgess Allison and John Hawkins received a patent for making paper out of Indian corn husks. Lozanna, in Italy, gave the Society of Agriculture, at Turin, some paper specimens made from various materials, even bark from Canadian trees.

"Rags! Rags! Any Old Rags?"

There were fourteen paper mills in Alsace, France. In 1802 they made about 40,000 reams each year. This they exported, to the extent of two-thirds, to both Switzerland and to Germany. Mills also existed at Languedoc, Lyons, Guienne, Bretagne, and Poitou to export paper, at that time.

Another Englishman succeeded in making an almost endless paper machine in 1803. This was Bryan Donkin. He had worked three years at the job, and eventually had a model like that of Louis Robert, of France. So Didot and Gamble, when they landed in England, went to Donkin, and asked him to make the Robert patent. This was done, and it was an immediate experimental success.

That year, in 1803, the average yearly importation of rags for Great Britain was around 3,111 tons. This included both 1801 and 1802, as the average. That same year both Berne and Basil were making excellent paper in Switzerland. It was very white and it was strong. This paper hurt the business of the French exporters. But rags in England were still in huge demand. Magistrates were impelled to advertise for rags to keep local mills busy. It was said that £60,000 in cash were being sent abroad to buy rags, and that it was the patriotic duty of Englishwomen to save rags, and to sell them to the mills, or to the dealers. In Paris, in 1804, Peignot said there were 228,000 reams of printing paper, alone, consumed each year.

Again the Louis Robert machine came to the fore. This was in 1804, when both Henry and Sealy Fourdrinier bought the Didot and Gamble rights in the patents. These wealthy Fourdrinier brothers were stationers in London. They also made paper. So they started to improve the Robert machine, with many practical suggestions. And the machine, until then the Robert, became the Fourdrinier. Boxmoor was the site of their experiments. They used considerable sums of money to perfect their model.

Meanwhile, Donkin made his second paper machine. This was in 1804, too. Two Waters was the site of his machine shop. His machine was so successful, also, that manufacture by this method only awaited production of the necessary quantities of machines. In 1805 he was still working on improvements to the Fourdrinier patents. He changed the position of the cylinders. This was done to dispense with the upper webbing. Even then, the Fourdrinier model was able to make paper from six vats in twelve hours. Hand work had required, was requiring, three months to make paper, from rags to delivery of stock. But this new Fourdrinier made paper for printing or writing available the very next day!

Rice paper, from China, came to England in 1805. It was largely used for artificial flowers. Princess Charlotte was said to have paid 70 guineas for a single bouquet made from this so-called paper. Formosa was the place of production of this peculiar paper, cut spirally, flattened by pressure, all by hand.

In 1806 the Fourdrinier machine was so far advanced that the manufacturers showed that one machine used the production of seven pulp vats. Working twelve hours daily (a regular custom, at the time) this material indicated a saving in manufacture as follows: Seven vats, per annum, £2,604:12s, while the new Fourdrinier method machine cost only £734:12s for the same amount of work. Saved, therefore, was £1,870 per year. Hand made paper cost sixteen shillings the hundredweight, while the machine made cost three shillings, six pence. No other argument was necessary, then or now.

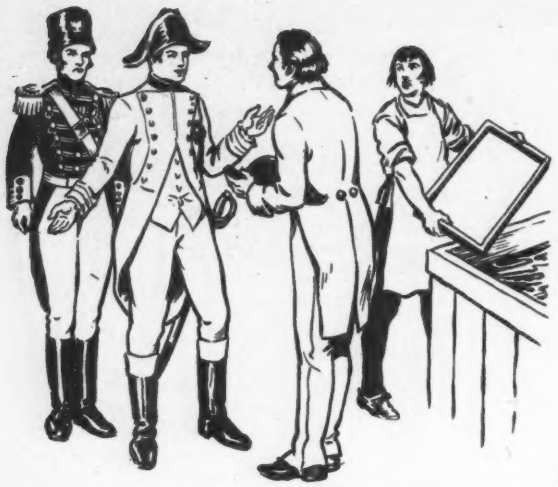
Formosa Sent Rice Paper for Flowers to England

In France, along in 1806, mills produced vellum paper at Angouleme. This had been so after the Dutch vellum was imitated from original production in 1740, and at Annonay since 1781. So this year an exhibition was held in Paris, and the Angouleme manufacturers were awarded especial merit prizes.

Fourdrinier machines were encountering financial difficulties in 1807. Fourdrinier brothers told the British Parliament, in a statement, that they had been obliged to withdraw £60,000 from their successful stationery business to forward the improvements for the new paper machine. Paper manufacturers were still shy of it. They awaited proof of its savings and its results in production. Fourdrinier machines then sold for £715 to £1,040.

In Scotland, where the hand production slowly continued, the 1807 figures at North Esk mills were 681,000 pounds that year. To show a contrast with European development and Near-East, or Asiatic stagnation, the Sultan Selim III was assassinated the next year, in 1808, and his advanced printing plant in Constantinople was destroyed by the mob. This included an early mill, which supplied the plant with paper, at Scutari.

And John Gamble, the adventurous Englishman, who had originally come from France with the early Louis Robert patents for the Fourdrinier machine, now (in 1808) surrendered his last investment in the device. He lost both his time and his money, as usual.



Czar of All the Russians Recruits Papermakers in England

Eight years of hard work on the machine, as its master mechanic and advisor, resulted in assignment to the Fourdriniers of his final papers.

Dickinson, still another Englishman with an idea, was making paper in 1809. He, also, made an endless belt machine. Instead of using a traveling wire-cloth, Dickinson used a polished, hollow, brass cylinder, perforated, covered with the wire-cloth, which revolved over the pulp. Water was sucked up by refraction.

And, in France, in 1810, Didot was having his troubles. Louis Robert, the original inventor of the Fourdrinier, sued Didot to recover his patent, which he did. But, meanwhile, the English Fourdriniers were having their own difficulties, too. Estimates were being made of the entire paper production for the Commonwealth, and Dr. Colquohoun got the figures up to £2,000,000 in 1813. Statistician Stevenson said no, that the right value was not more than £1,000,000. That same year, 1813, a machine was perfected in England for cutting waste paper into shreds, for immediate manufacture of pulp. But the Fourdriniers had so simplified their new model that only three men were employed on each machine, instead of the former five.

Crude Chemicals in 1816 Caused Book Decay

In the next year, 1814, Bertholet introduced his new method of bleaching pulp. Czar Alexander came to England from Russia that same year. He urged paper makers to go back with him to Russia with the required machinery, as his predecessor had done at Dresden long ago. In Russia, these mechanics built a large mill at Peterhoff. France, to meet the decline in sales abroad, now devoted its attention to specialties. Each town and mill had its own almost individual product. Mills at Annonay, Angouleme, Auvergne, les Vosges and le Limosin eliminated natural competition by sticking to their own odd style of production. And each mill, too, progressed in its specialty, evolving much better paper.

To France, at last, came the first practical paper machine in 1815. This was sixteen years after the first idea originated in France. Fourdriniers had finally succeeded in breaking down the barriers in France. In competition with the week's work of making 4,000 sheets of paper by hand, this new Fourdrinier did the job in a day. Too, the hand work was in small sheets, while the machine was practically endless in its effort.

Bleaching, in 1816, was found to be poor. Books, notably Bibles, printed two years previously, now fell apart, as the paper crumbled. British and Foreign Bible Society complained of the paper. One year later, in 1817, Heath, a manufacturer of English pasteboard, introduced a new superior and high glaze.

Another process, in 1817, had to do with the E. B. Ball method for making paper of floss silk, flax, hemp, and even Russian linen. Ball was a mill owner. His new idea in paper was to make it white, durable. Roger Didot, who had come to England from France, a year later, in 1818, got a patent to make wove and laid paper on a machine already in use. This machine made paper of these sorts in single sheets, or in continuous endless length, as desired. That year, too, the Prince of Wales Island Gazette was printed on rice paper, said to have been made from rice straw.

Machines, in 1818, were sent to Prussia, and used in Berlin. During the next year, 1819, the same London Society for the Encouragement of Arts and Manufactures gave thirty guineas to an inventor named Finsley for an ivory paper. This process was said to be of an ivory character surface. But, even though the Fourdrinier machine was producing much paper in England in 1820, the same antique manner of drying paper in lofts was still practiced. This caused a great loss in time, and the volume of production of the new Fourdrinier was thus hampered.

In France during the same year, 1820, an inventor named Huygeron obtained a patent for a straw paper. This process made a white and durable paper, it was claimed. In that same year, too, the Danish Govern-

ment granted a five year patent for paper made from seaweed. It was white, strong, and cheap. In the following year, 1821, Fontenelle, in France, made a paper from licorice wood. He boiled it, he said. Janbeaurt, in Marseilles, also made a paper from hemp and licorice wood the same year.

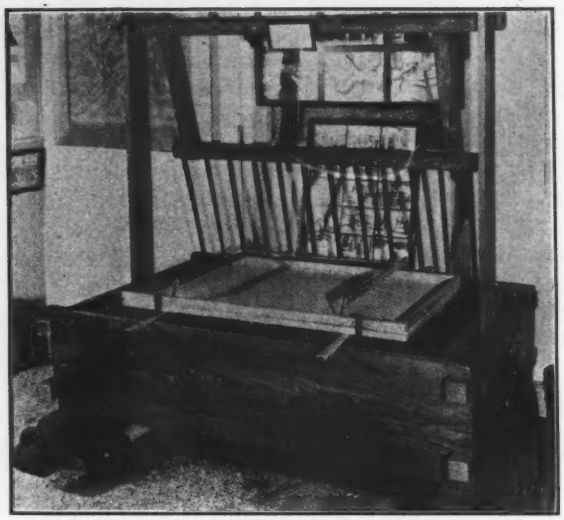
Over in England another invention for the paper machine was that of T. B. Crompton, also in 1821. He devised a plan for drying and finishing paper with cloth on heated cylinders. Shears were also used to cut the paper into required lengths. So this Crompton patent made superior finished paper, and the cutting was cleaner, sharper. England made 48,204,927 pounds of paper that same year.

By some out of the way exploration, in 1823, a roll of papyrus was found on the island of Elephanta, in the East Indies. This was lettered in large, antique capitals, in the style used during the reigns of the

Rice Paper Is Not Paper at All

These thin, brittle sheets are simply cut from the inner pith of the Tung-Tsau (tetrapanaxpapyrifera, formerly fatsia payrifera) a plant growing in the hills of Formosa (Taiwan, under Japanese administration). In the occident the true nature of this material was misunderstood, and it was believed that the Chinese made the "paper" of rice, hence the erroneous European name for this Chinese material used so much for oriental paintings, and even believed to have been the first source of cigarette paper.

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)



(Courtesy, Dard Hunter Paper Museum, Mass Inst Technology)

Japanese Make it by Hand

Papermaking vat, agitator, and bamboo mould from Najio, Hyogo, Japan. Workers in this district formerly sat at this work, as has been the practice for hundreds of years, hence the low-built vat. In working at a vat of this style, a woman forms the paper in a flexible bamboo mould, and couches each sheet directly upon another, without interleaving felts, as is the European practice. Previous to the war, an artisan received about 2 yen for forming and couching something over 500 sheets of paper, which measured 26 by 49 inches. Stock is usually mulberry bark, and, in normal times, the paper was exported, and used for numerous aesthetic and industrial purposes. Mould shown is the most common type used in Japan; the "laid-lines" are composed of finely-drawn bamboo, and the "chain-lines" of linen.

Ptolemies, and under the early Roman emperors. It was a part of Illiad. No one, of course, knew how it had traveled to the Dutch East Indies.

That same year, 1823, there were 192 paper merchants in France. A mill owner, that year, Cansin at Annonay, had a Fourdrinier machine. It was of the improved English make, and believed to be the only one of the kind in operation in all of France. That same year a mill was opened at Okainon, very near Warsaw, in Poland. It was owned by Asile Henrick, who said he was going to make roofing paper. He also specified that it was to be water and fire proof.

English manufacturers, at that time, 1823, were using sulphates of lime and gypsum. This gave added weight to their paper. About 12% was thus gained. Buyers didn't seem to like it. Old sacks, ropes, and so on were now used in some English mills. This particular sort of material made paper for English merchants, particularly for wrapping.

Laferet, in France, commenced to make a paper of beaten hemp, liquified with ordinary water. For this he obtained a patent in 1824. Japanese had been making similar paper for years, and with the use of lime water. J. McGuaran made a paper in England, at that time, from hop vines. He received a patent. His paper was of a dark brown, used for wrapping, also. A. Nesbit likewise got a patent on the use of moss for paper. This was of a coarse material, too. But the Japanese, again, in 1824, were making a beautiful paper from the mulberry tree. Louis Lambert, a Frenchman, received a patent in England for the use of straw pulp, from which he extracted the coloring. This was made with an ordinary rag engine, and needed no special machinery.

Sieur Brepols, in Belgium, made a superior paper during 1824 in colors. Mill was located at Turnhout. It cost 80 to 100 francs a ream. It was made in a large sized sheet. And William Van Houten obtained an English patent the same year on this Hollander's idea of using moss for both paper and for felt. He Machine. That was in 1809, when Dickinson, as also obtained a patent on this process in France in 1824.

A Hampshire mill in England made a paper of pine shavings. Owner of the mill was named Sharp, and he got a patent for it in 1826. Some of that, or even previously discovered pine processed paper, from the same source, was also exhibited in Boston, Massachusetts. Canson, of France, that same year, 1826, applied the Dickinson method to the Fourdrinier machine. That was of 1809, when Dickinson, as previously related, used air to manipulate the pulp. Canson used suction pumps. This he did not tell anyone for six years.

In Italy, the same year, 1826, Cappucius Brothers, making paper at Turin, used poplar and other wood for pulp. Writing, printing, and even wrapping paper were so manufactured. And the king gave the brothers exclusive rights for ten years to make paper from these materials.

Also, in France, Firmin Didot's mill, at Mesnil, made use of the Crompton patent on drying in 1826. This was the first use of the Crompton method in France. Donkin, in England, busy with his Fourdrinier machines, put up a "first" in Denmark that same year. First paper mill in Denmark was built by order of Christian III, at Fredericksburg.

In France, along in 1826, there were 80 printing offices in Paris. This was in addition to the Government printing office. In all, they used 280,800 reams of paper that year. Canson Brothers, at Annonay, ever progressive, took out a patent in 1827 to size paper. Sizing in the vat was necessary. But gelatine, as sizing, injured the felts in production. So the famous Cansons used probably the first wax sizing. Delcambre, at that time, made use of sizing in rosin. Obry used alum and rosin. That mixture was previously dissolved in soda. Then it was combined with potato starch. It was placed in the vat without damage to the pulp. Both printing and writing papers were thus sized.

Didot Brothers and Lefevre, that same year, 1827, took the first paper machine to Italy. They set it up in Sicily, home of the original paper production for Italy. Louis Pierre Poisson, of Paris, got a patent for the use of licorice wood and pasteboard waste. Of this pulp he made paper. Pierre Balilliat, of Macon, took out a patent on a chemical pulp process, eliminating linen rags. Count de la Garde received letters patent, in England, along in 1827, to make paper from textile plants, either alone or with the usual rag pulp. Benjamin Devaux, in Paris, took out another patent on making paper from pasteboard and hemp. William Van Houten continued his experiments. He made, eventually, a paper from moss. He had patents in both England and France, as previously noted in 1825. Meanwhile, there were but four paper machines in France, from the installation of improved machines in 1825. And, although the paper machine patent was French, the English had been using the machines, now, for twenty-five years.

Patent rights in England on paper were now numerous, James Palmer, a mill owner, obtained patent papers on improvements in paper moulds, and upon other equipment in the production of paper. George Dickinson, again, got a patent on better production machinery. These machines came into extensive use. Lateral shaking movement, on the original Fourdrinier machine, was injurious to the pulp fabric on the wire web. So Dickinson obviated the objectionable fibres, thicker in width than length, by a rapid up and down movement. Donkin, taking this up, made machines with greater mechanical precision, thus producing better, more evenly grained pulp and paper.

Odent, in France, in 1828, obtained a patent at Courtalin, for a machine to ease the paper, and with greater economy of production. Cowper, in England, that same year, received patent papers for a paper cutting machine. Other similar machines soon followed, and Cowper's patent fell into disuse, except as a model for later inventors. At that time, too, T. B. Crompton and Enoch Miller took out patent papers for cutting the endless web of paper lengthwise. This was accomplished by the use of revolving circular blades. These were placed on a roller, parallel to a cylinder. Around this cylinder the paper revolved, and so unwound.

Across the channel, in France, in 1828, Cyprian Brard, at Frejus, invented a method of producing pulp from decayed wood. This he mixed with waste. Bernadotte, with others, received a French patent for making paper with animal substances. This was called aporentype. Over in England a method of beautifying paper was evolved and patented with superior glazing in sizing. Alkalies were used to do this. They were dissolved in water with beeswax and alum.

John Dickinson, again, in the next year, 1829, devised improvements in machines for cutting paper into single sheets. His paper was composed of cotton,

Everyone in the Family Made Hand Paper in Japan

One Roll of Paper in 1830 Reached the Then Unheard of Length of Over Two Miles—13,800 Feet, and was 4 Feet Wide

flax and silk thread, webbed or laced in such a way as to be below the surface. In France, that same year, 1829, Rondeaux & Henn made paper from a French patent of leather cuttings, mixed with refuse paper. That year, also, England paid home duties on paper of £728,000.

Hay was used for pulp paper in France by an inventor named Julien in 1829. Julien also took out a patent for a coloring process. Across the sea, in Mexico, maguey was used in paper, as a substitute for rags. A law was enacted to prohibit the use of any other sort of material for Mexican paper. And, back in France, Quirini received letters patent on paper from straw and refuse pasteboard. Fourdrinier machines were now popular in France, and the English appeared to have a monopoly on this business, much to the disgust of the French. Some French equipment machines, however, were exported to the United States that year of 1829.

In England, too, Thomas Cobb's patent on tinted paper included a new method of embossing the stock, at the same time. This was accomplished by pressing the pulp between rollers or plates, which were engraved with various designs. Cobb's process eliminated staining of the finished paper with various inks. That had long been the custom with wall paper. And the Cobb method also used silk, velvet, or any such material as a paper surface. These products, when embossed, appeared to great advantage as a housing tapestry, made for the well-to-do in 1829.

Montgolfier, the same year, 1829, made a so called papier linge. This was used for table cloths and for drapes. Finished, the material was as soft as Silesian linen. Yet it was sold at Lyons for the price quoted on ordinary paper. Imitation silks, in arabesques, sold for four to five sous the yard.

In the next year, 1830, the French mills appeared to be at a decided disadvantage in sizing paper, as the English mills were farther advanced in the processing of the paper. But Lacroix, the famed manufacturer in France, acquired the method. This was used so long as hand made paper was created in France. But machines were slowly, yet surely, displacing all hand production in French mills. Hand made paper was, in most cases, excellent material. So the machines had a long way to go to equal the quality. Brand, a Frenchman, made coarse paper from pine trees at this time.

But at Whitehall mill, in Derbyshire, England, a sheet of paper was made on a machine in 1830 which measured 13,800 feet long, 4 feet wide. This was astonishing, at the time. London's custom house collected taxes of £2,200 for rags; £1,400 on artist's paper; £701,000 on ordinary paper in 1830. Richard Ibotson, in England, that same year, found a way to separate knots from the pulp. Previously, the strainers were unable to do this necessary job. Hand work was formerly required to pick these things from the pulp. And paper was damaged, too, in the previous process, causing ultimate ruin to printing type and to cuts. Those old cuts were all of wood, at the time, of course.

John Hall in 1830 patented a means of modifying the original Dickinson patent of the cylinder mould. Hall devised a plan of keeping the vat supplied with additional water. This had the purpose of creating greater pressure on the surface of the cylinder, forcing the pulp fibres to adhere to the mould. And John Wilks, a British machinist, improved the Fourdrinier by adding a perforated roller so the water might escape from the pulp webbing. This was accomplished previous to the pulp pressure roller action.

But Dickinson, again, patented in 1830 a method of making paper in two layers, brought together upon a second cylinder. He thus made a superior, thicker paper. Thomas Barratt, a mill owner in England, effected a patent upon inserting the water mark. This was so done as to resemble the heretofore method of hand work. Barratt also made cast iron rollers, in place of the lathe turned equipment, which was not so true to form in 1830. Better finished paper immediately resulted. Rollers now more closely ground together. This plan allowed only a small amount of water to flow over them, without emery or any other grinding material. In a continuous operation, for some weeks, practically true cylinders were made. They made paper of greater accuracy.

Jean Jaquier took out a French patent in 1831 for making the endless paper roll with wire markings. This was similar to laid paper work. For the old hand made laid paper was still favored, and could be distinguished, previously, by such markings. Also, in that same year, E. N. Fourdrinier invented a machine to cut the web of paper, transversely, into any desired length. Turner, who operated a mill in England in 1831, obtained a patent on a new strainer. This also eliminated lumps in pulp. It could be used on either the Fourdrinier or in the hand processing. At

this time the chiffonniers, or famous rag collectors of Paris, rioted against new municipal rules about removing the refuse of the streets before it could be examined for rags for paper. In Ireland, 600 paper makers were employed in 1831.

Germany imported about 12,000 quintals of paper in 1832. Germans still lacked sufficient paper. Goumar, in France, was awarded a 200 franc medal for neutralizing the acid in lithographic paper. His simple method was just to run the pulp through lime water. England, at that time, was collecting £815,000 on home excise, a gain of about £100,000 in three years.

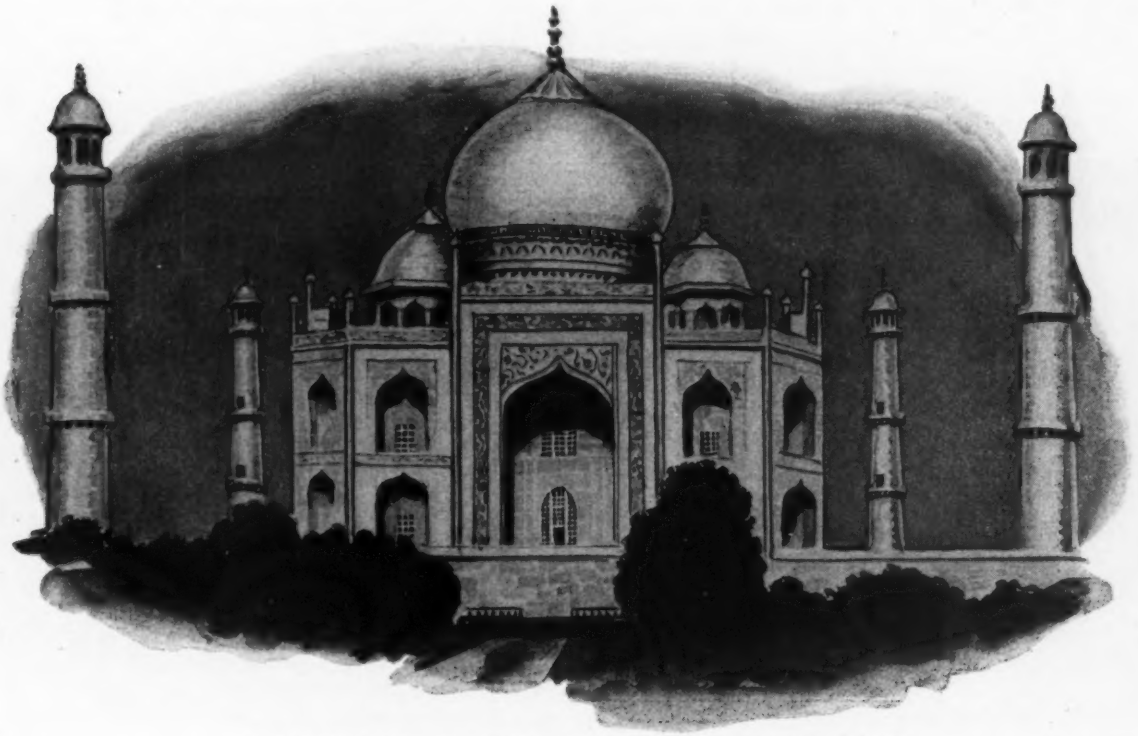
And Henry Brewer, in England, in 1832, modified the parallel rod strainer of Ibotson. This he did by making square boxes with grid bottoms. They operated with a powerful up and down motion in the pulp tub. Levers, rotary shafts and cranks were used. Joseph Amies, also in England, did his bit at his mill by improving the paper machine with another form of making a base for the strainer. This eliminated many knots and bothersome lumps in the pulp. Towgood took out a British patent in 1832 on a new paper cutting device. It displaced the reel, cutting the paper as it came from the cylinders. Manufacture of paper by hand was about over in France in 1832. Machinery was used in nearly all the better mills.

Henry Davy took out a rag cutting and lacerating patent in England in 1833. It was not his own idea, but that of a man from abroad to have an endless feeding cloth. This carried the rags to the feed rollers. Rotary cutters then passed the material to an inclined sieve. There they were well shaken, to remove dirt and dust. Tripot, in France, that same year, took out another patent on production of paper from seaweed. In Dublin, Ireland, an oddity at a printer's dinner was a sheet of paper for a table cloth, 125 feet long, 5 feet wide. This showed the development of the Fourdrinier from its early stages, only 33 years before. France was again doing quite an export business in 1833. Total paper sent to foreign trade totaled 5,323,261 francs. That was then more than a million dollars in U. S. currency.

A cheap publication in London, the Penny Magazine, in 1833, issued by the Society for the Diffusion of Useful Knowledge, used 14,000 reams of printing paper annually. Two machines were required to make this amount of paper, in constant production. Yet a single machine, in a paper mill, was believed, at the time, to be a considerable business. Each machine, in total handling, preparation, and so on, required forty workmen.

Chlorine had a black eye in 1834. This was on account of the fact that 30,000 books of one publication had decayed in England in sixteen years. Excessive bleaching of pulp was placed upon chlorine. In five years, from 1829 to 1834, paper annually made in England averaged 70,988,131 pounds. A decided novelty, introduced in 1834, was black paper. This was treated with a chemical bath, and, when the writer touched the paper with a pen merely dipped in water, a character was produced.

In Sweden, that year, a book was published of paper made of beet root. This was a strong, durable paper,



India Still Makes Hand Made Paper, Even at Ghandi's School

but of coarse, negative white. Husks and Russian matting were also used in Sweden for pulp, at the time. France, in 1834, had fully a dozen paper machines in operation in various mills. They were usually built in England. Mill owners could not then make a profit on hand made paper. It was either the new machine, else a loss in net. First and second class paper in England in 1834 produced a revenue of £718,043; of this only £101,023 was on the poorer stock.

In the following year, 1835, Ireland was making paper from peat. It was of poor quality. To get more rags, Hayti exported 31,192 pounds to Europe in 1835. In Thibet, old paper was reworked with the bark of the sultarua. But the Hindu paper makers in India made much better goods. And the Hindus used the same basic material. Taxes in England, that year, were suggested to Parliament at 1½ pence per pound, just one half of the current 1835 rate. That was for first and second class paper. Pasteboard, in another classification, was also to be reduced at the same ratio. Millboards, glazed paper, sheathing and button paper, button-board, which paid a tax of £1:1s the hundredweight, were suggested as the same as pasteboard, 14 shillings per hundred. Total production, that year, was 70,655,287 pounds. And the government collected £838,822 on that amount.

England, operating nearly 750 mills in 1835, made paper valued at £6,000,000. But the Government tax was so heavy that it represented three times the wages of all the English workmen employed in the mills. It was then believed that 50,000,000 pounds of first class stock were made. And the balance consisted of about 16,000,000 pounds of secondary paper, plus some odds and ends. Approximately 100,000,000 pounds of rags were then used in the country.

In Paris, the royal printing office in 1835 consumed about 300 reams of paper daily. That was equivalent to about 100,000 reams annually.

In the next year, 1836, James Brown, of the Esk Mills, located near Edinburgh, as previously noted, contrived an appliance to use air under the web of the machine. A rectangular box, transversely placed beneath the horizontal wire cloth, was minus the usual interposition of perforated covering.

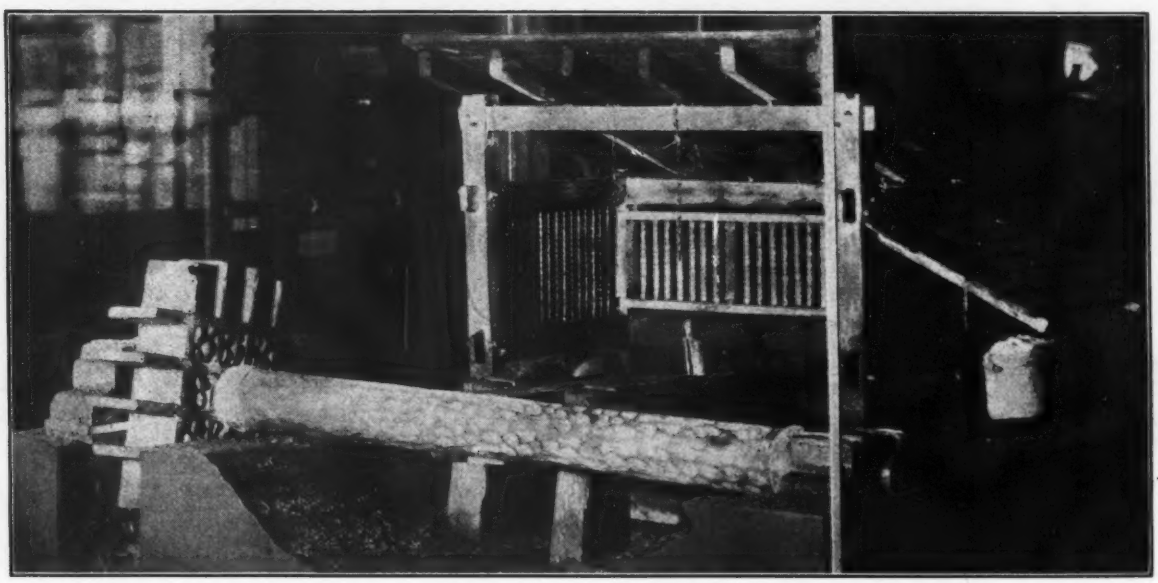
Taxes collected in Great Britain in 1836 were upon 82,145,287 pounds. Not included in this total were 8,032,677 yards of wall paper. So the Government realized £812,782 in taxes. Writing and printing paper enjoyed reduced taxation from three pence the pound to 1½ pence, making all grades equally taxed at the 1½ pence figure. Former rates had been in effect from 1811 to 1836.

In 1837 Edmund Shaw, in London, again revived the Indian corn husk and stalk production of paper. But it was extremely difficult to make good white paper of this pulp.

During the following year, 1838, Great Britain collected taxes on paper to the reduced total of £554,497, because of the previous year's reduction in the rates. Also, J. V. Degrand, in London, devised a patent for pulp to make both paper and pasteboard. He used white woods, like poplar, eliminating bark. That same year De Breza, in Paris, invented a chemical compound to make paper fire-proof, also to prevent the ravages of insects, pests that had always made considerable destruction in all sorts of paper.

Pattern for Stamping Mill in India

A scale model of a stamping used for the maceration of rags in Arach, north Kashmir. Stampers used in the earliest paper mills of Europe were founded on this seemingly-crude appliance. As late as the year 1861 the French Government insisted that all paper used in the stamp-office be beaten in this manner.



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology.)

Scarcity of Rags Compels English Salvage Drive

In 1839, Henry Crosby, in London, received a patent on refuse tanning and hops. Tan bark and hops were thus used in combination. Rag processing was also employed in the work. T. B. Crompton, once more, succeeded in obtaining a more uniform refraction under the wire cloth of the machine with a fan. In France, that same year, banana leaves were exhibited, made into paper. An inventor named Rocques went to the trouble and expense of creating a handling plant for this raw material in Havana, Cuba. But the expensive necessity for heavy bleaching made the process too expensive, with a waste of one-third the total weight.

Brogniart, in Paris, directed the attention of the trade in 1840 to the changes effected in wood fibre when mixed with acids and alkalies in the pulping stage. But few, at the time, paid any attention at all to his ideas. Mills in England, that year, numbered around 700. Eighty more were located in Scotland. Some few, again, were in Ireland. About 27,000 people were then employed in the paper crafts of all the United Kingdom. About £1,200,000 in paper was thus produced.

In Russia, up to 1840, slow progress had been made in the two or more attempts to create a paper industry through the intercession of the czars. Development of all manufacture in the Russias was extremely slow, but the manufacture of paper appears to have been the slowest of all.

Another man, in 1840, Lagrange Bull, in the French isle of Martinique, came along with the suggestion of banana leaves for pulp. But his idea, like that of Rocques, seems to have evaporated with the years. Meantime, 280 Fourdrinier machines were in complete operation in all of the United Kingdom. Every single day they were, apparently, making 1,600 miles of paper. This was from four to five feet in width. Paper, accordingly, had decreased in value and in price about 50%. Also, the Government at once benefitted to the tune of £400,000 annually. And the public, too, with its increasing reading matter, likewise in all sorts of other necessary paper supplies, benefitted greatly.

Rags, in 1841, were collected in Great Britain for writing paper, and so impressed upon the people. This was necessary, to induce housewives to save the rags for the dealers and mills. Printing paper rags then came, mostly, from Italy, Germany, Austria. Trieste appeared to be the more important port of shipment

Old Sacks of Burlap and Rope of Hemp for Pulp Gathered by Ragpickers

for these supplies, so necessary for the public prints of the time. That year, too, England made 97,103,548 pounds of paper. And the next year, 1842, there were 356 paper machines in operation. That figure included those in all of Great Britain, inclusive of Ireland. They used 372 vats. In the following year, 1843, this had increased to 367 machines, but with only 362 vats. They were making substantially enough paper for their own use. They also exported considerable, especially in manufactured products, such as books, which were then valued at £100,000 in foreign trade. Yet England was still obliged to bring in the finer paper for engravings from the more adaptable France. Wallpaper, too, was largely made abroad, especially of the finest material. But the total duty paid in England, on such paper supplies in 1843, was only £2,800 annually.

In the following year, 1844, all the paper mills of Great Britain had 370 machines, 359 vats. So the gain, that year, was comparatively small, indeed. That year, also, the first invention is recorded, in Germany, for a wood pulp grinding machine. It was invented by a man named Keller. But he had no capital, so sold the rights to another, named Voelter. Keller was so poor he had to have the aid of fellow paper makers. Germany, meanwhile, was importing each year about 8,000 thalers in crude packing paper. But they exported better papers to the total of 256,000 thalers annually. Even Russia, in a spell of industrial action, at the Peteroff mill, turned out 70,000 reams in 1844. This was in fine paper, too.

And Austria, in 1845, summed up its mills as 980. Of these only 40 had machines. Altogether, they made 314,000 quintals in paper. This sold at our currency rate of thirteen cents the pound. Some 13,000 work people were employed in the mills, besides an unknown number of rag pickers.

R. A. Brooman, in London, that same year, took out a patent on paper made from rubber, or gutta percha. With that he mixed other unknown materials. Object of the rubber material was to obtain strength. In 1845, too, the total production of paper in Great Britain ran to 124,247,071 pounds. Foreign trade in paper amounted to 4,864,185 pounds.

And, in 1846, the German States of Thuringian had 41 mills. These mills operated 53 vats. They employed 274 people. Prussia, that year, had 394 mills. These establishments employed 6,393 workmen. They worked with 503 vats, 72 machines. Bavaria, too, listed 176 mills that year. These mills had 257 vats, 11 machines. Some 1,884 workers were employed. Saxony, at that time, had 66 mills, 6 machines, 68 vats. Some 997 workers were employed there. Hesse had 21 mills in 1846. These mills had 1 machine, 18 vats, with 170 workers. But, as that was only in the Grand Duchy, the other portion of Hesse, in the electorate, had 28 additional mills, 6 machines, 39 vats, with 299 workers. Zollverein operated the electorate mills. Baden, with 32 mills, 14 machines, 33 vats, gave employment to 624 people. Nassau had 27 mills, 6 machines, 30 vats, 196 workers. Zollverein, alone, imported paper worth $9,000, Prussian value. Exports of that group were $270,589 that year. Imports, as usual, were for coarse paper, exports for fine.

Also, in Paris, in 1846, E. F. Vidocq again used the device of obtaining pulp from leather waste, hemp, cotton, wool, oakum, and an unknown list of other products, which he freely mixed in the vats.

Genoa, from the ancient paper district of Italy, in 1846, exported 1,178 tons of paper. This went to Spain, Mexico, Brazil. And, while this was going on in other parts of Europe, Great Britain was making 127,412,482 pounds in 1846. Of that, 4,836,556 pounds were exported. So 405 machines were then in use in 378 vats, possibly more than all countries in Europe combined.

Just 100 years ago, 1847, Figuier & Poumarede, of Paris, patented a parchment paper process. Also, the total paper output in Great Britain, that year, was 121,965,315 pounds. Of that amount 5,852,979 pounds were exported. So 405 machines were then in use in the United Kingdom, with 373 vats. That represented a steadily increasing capacity for production. In Denmark, too, that same year, 300 tons of paper were imported from France, Belgium, and elsewhere. And The Netherlands took Belgian paper, also.

Germany's Zollverein likewise imported 219 tons, of the value of $7,167.60 in 1847. But only 700 pounds of rags were imported by the Zolls. Exports, however, were 148 tons. That went to Java, largely. And 1,200 pounds of rags were sold abroad. Saxony had 66 mills that year. They used only 6 machines. They also employed 992 people. Foreign sales and purchases were almost nil. Voelter improved the German Keller grinding machine. He made the pulp into newspaper. Denmark stepped its imports up to 334,000 kilos, which paid $13,020 in duty. Denmark also exported 53,290 pounds of rags, worth $1,614, in the following year, 1848.

In Great Britain that year, 1848, production remained around 121,820,229 pounds. And the exports were similar to the previous year, 5,180,286 pounds. Machines gained only 2, to 407, with a vat loss of 6, to 367. Hamburg took imports of $239,568 value. Sardinia produced $2,400,000 in paper, and used it

all at home. Spain exported 140,000 reams. Cuba took 94,000 of this; Chili, 16,000; Puerto Rico, 10,000; all other countries, 20,000 reams. Leghorn exported rags and paper to the total of 30,000 pounds. About half of that went to England. Other half went to the United States.

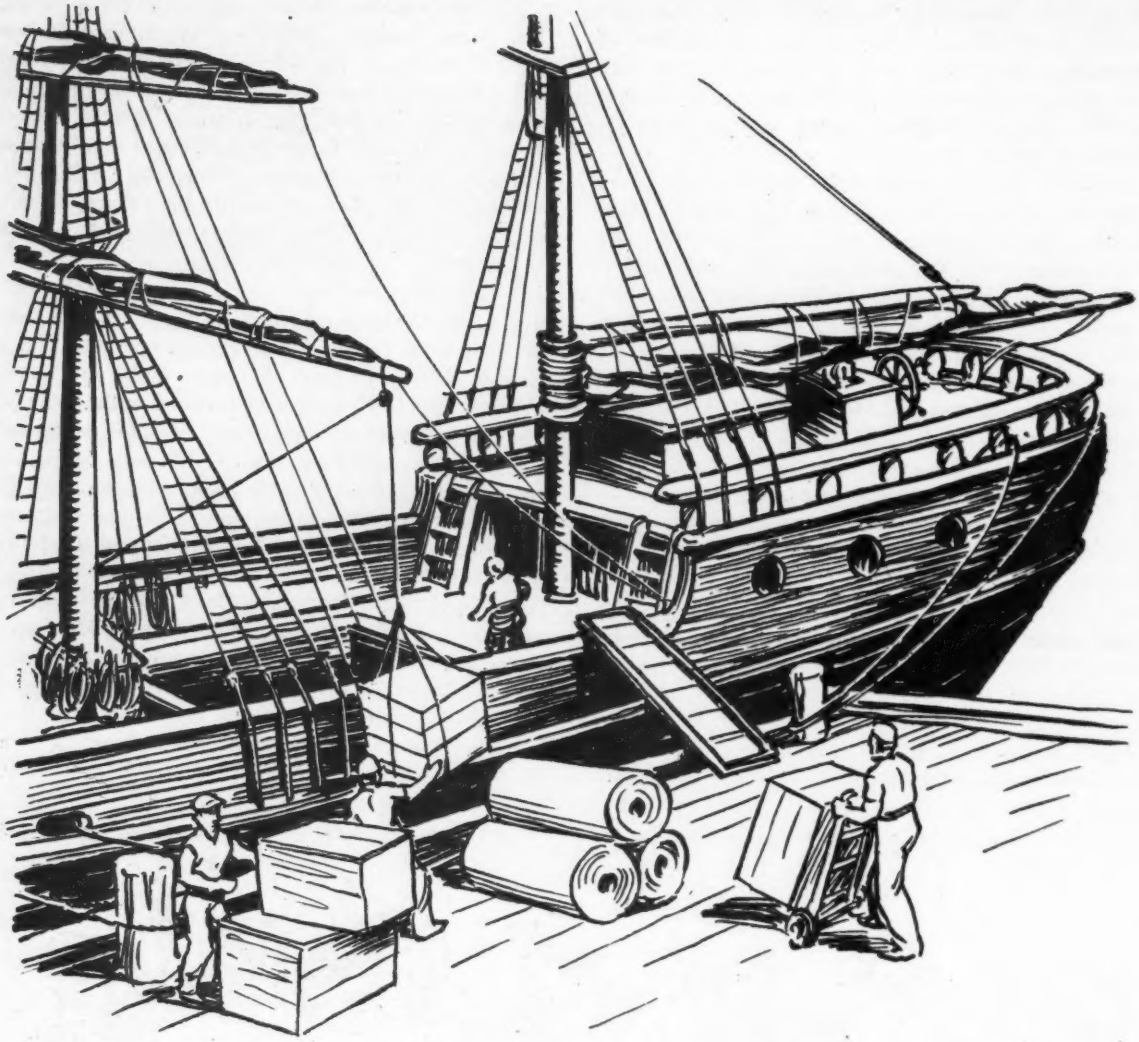
Belgium, the next year, 1849, had 74 mills. They employed 1,893 workers. Twenty-two engines were used, with 254 horsepower. Also, two horse mills with two horses, each. And there were 68 water mills, 7 wind mills. Belgium sent 19,950 francs' worth of paper to the United States that year. In England, also, W. Brindy patented a water proof paper. He simply saturated the web of the pulp with linseed oil. This was then placed at high temperature for drying. In France, that year, Grimpe & Colas patented a paper for bank notes. It was said to be impervious to forgery. Academy of Sciences failed to penetrate the secret of the stock. And an Englishman also invented a means of splitting paper. He successfully split, edgewise, a Bank of England note. Belgium exported paper to the amount of £36,940 in 1849. France, specializing on fancy, decorated papers, exported wall paper to the United States amounting to 214,000 pounds. France also imported, that year, 1,620,000 pounds of rags. Total foreign trade in French paper in 1849 was 9,-250,000 pounds for export. Belgium imported crude stock and rags to the sum of 14½ tons that year. Export was valued at only $12,000.

Amos & Clarke, in England, received 1849 letters patent on a machine strainer, also for a cutting device. That item obviated difficulties encountered in the speed of the newer Fourdrinier machines. Old cutters had dispatched sheets cut into all sorts of irregular sizes. Machines, that year, in Great Britain totaled 406, with 353 vats. Paper manufactured there totaled 132,132,660 pounds, a new high record. Of that, 5,-966,319 pounds were exported. In France, a mill adopted the first wood grinding machine at Souche in 1849.

In Germany, the next year, 1850, the Zollverein used 1,180,000 hundredweight in rags. At that time 794 mills, with 116 machines, were in operation. They made 36,964 tons of paper that year. Didot, in France, said there were now about 200 machines in the country, a new record. These units made 195 tons, each, annually. Total, therefore, was 39,000 tons of paper. But 250 additional vats made 2,000 more tons, of all sorts of paper, evidently by hand. One machine took 60 workers for handling, while a vat required 10. Mills in England that year were 327; in Scotland, 51; Ireland, 37; a total of 415 for the kingdom. Beating engines were 1,374 for England; Scotland, 286; Ireland, 86. Total number of machines in Great Britain for 1850 were 412, with 344 vats. In Germany, in 1850, Ebart invented an incombustible paper at his mill in Neustadt Elberwald. This he said was a "stone" paper, also water proof, and used for roofing. It was low in price, too.

With so many patents, in so many diversified fields

"Chiffoniers," or Guttersnipe Ragpickers, Riot in Paris



In 1848 Considerable Paper Was Shipped Abroad

of the paper industry, just in the past fifty years, the paper business, to be sure, experienced untold production benefits. As these inventions, some of them, at least, were made into practical units of production, the industry soared. Europe was setting a pace, but America, too, was producing in volume, now, from its own inventions and improvements. It was said, at this time, that there were more, far more, inventors than salesmen. Yet the industry was not only making paper, but selling it, also. It was finding new markets, as it has in every decade and extended period of progression. As the half century mark turned into the closing years of the nineteenth century, the paper industry took on new life.

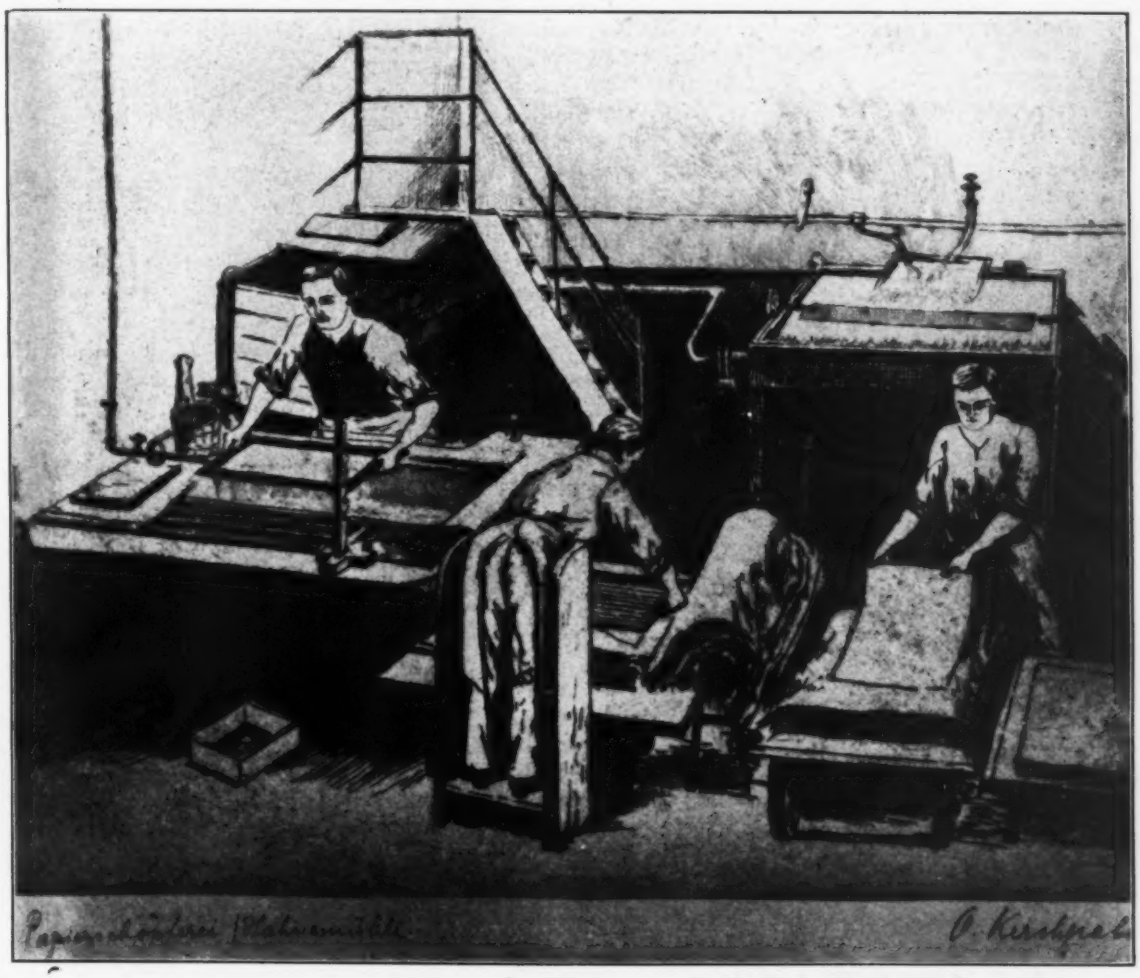
CHAPTER IV

Advancing Mechanical Progress Brings More Inventions Abroad

ADVANCEMENT in paper making production was rapid in this era because machines were more rapid. In fifty years the paper industry had turned from simple hand to involved machine manufacture. From ordinary attachments of equipment to the full blown erection of the more modern Fourdriniers, the industry had indeed, developed. There was no difficulty whatsoever selling more paper, therefore more machinery, when business was abnormal during the days of wars and rumors of wars. Everyone wanted paper, as they do today whenever we happen to have strife on a large scale. But the days of peace brought difficulties in economic distribution of paper. With such rapid strides in production there had, also, to be a similar rapidity in sales. This was accomplished, during various eras of the approaching fifty year period, by extraordinary uses for paper. To successfully establish these uses, this demand, was the problem. Many industries commenced to use paper and its products which had never used such material previously. It was, absolutely, a period of discovery and of adaptation. From all parts of Europe men and methods competed for this business.

Algiers, in 1850, made paper from the dwarf palm.

"Vat-house," showing the vatman, coucher, and layboy at their work, Hahnemühle



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

It was estimated that four million quintals, annually, could be obtained there of that raw material. And that it would cost 18 cents the hundredweight, yielding 36% of its crude weight. Dry, it would yield 50%, and that it required only two hours of beating for its production into paper. Production in England, and all of Britain, that year, was 141,032,474 pounds, another record. In England, this paper paid taxes of £693,741; in Scotland, £187,687; in Ireland, £44,096. In all, 7,762,686 pounds were exported in 1850, another record. To do this, Great Britain imported 8,124 tons of rags; U. S. contributed 32 tons, Egypt, 23, very small in the total. Italy and Austria were sending rags to the U. S. that year amounting to 15,861,266 pounds.

In the following year, 1851, Great Britain made 150,903,043 pounds, still ascending in production. And 8,305,590 pounds were involved in foreign trade, another high mark. Now, 413 machines were in use there, with 330 vats. At the world's fair in London, that year, a continuous sheet of paper, on exhibit, measured 2,500 yards long, a high mark for the time. Fully 5,500,000 pieces of wall paper were made in Great Britain in 1851. This paper was valued at £400,000. But in all the kingdom of the Two Sicilies, home of Italian paper, there were but 12 paper machines in 1851. There were also 12 vats, with 300 employes. All they made were 306 tons, annually. This paper was sent to Rome, Leghorn, Malta, the Ionian Isles, and to Greece.

Donkin, in England, manufacturer of the Fourdrinier machines, made 19 units in 1851. Eighty-three of these went to home mills, 23 for France, 46 for Germany, 22 for northern Europe, likely the Scandinavian States, 14 for Italy, (with the south of Europe included), 2 for the U.S., and 1 for India. Austria was then making 650,000 hundredweight in paper. To do this they had 900 vat mills, only 49 machine mills. Water power was then used to drive the machines, and furnished two-thirds of all production.

Very Low Pay in Switzerland in 1851 Dissatisfied Paper Workers

Brewer & Smith, improving English moulds, patented the invention in the U. S. in 1851. Only 6 machines were in operation in Denmark in 1851; one more was in Holstein. Total vats were 20, making 1,312 tons annually. Only 5 mills existed in Sweden that year. These mills used 7 machines, besides 8 vat mills. Spain had 17 machines in 1851. They bought them in England, France, Belgium. They also operated 250 vats that year. Annual production was 4,741 tons, in all. Sardinia had 12 machines, 60 vats.

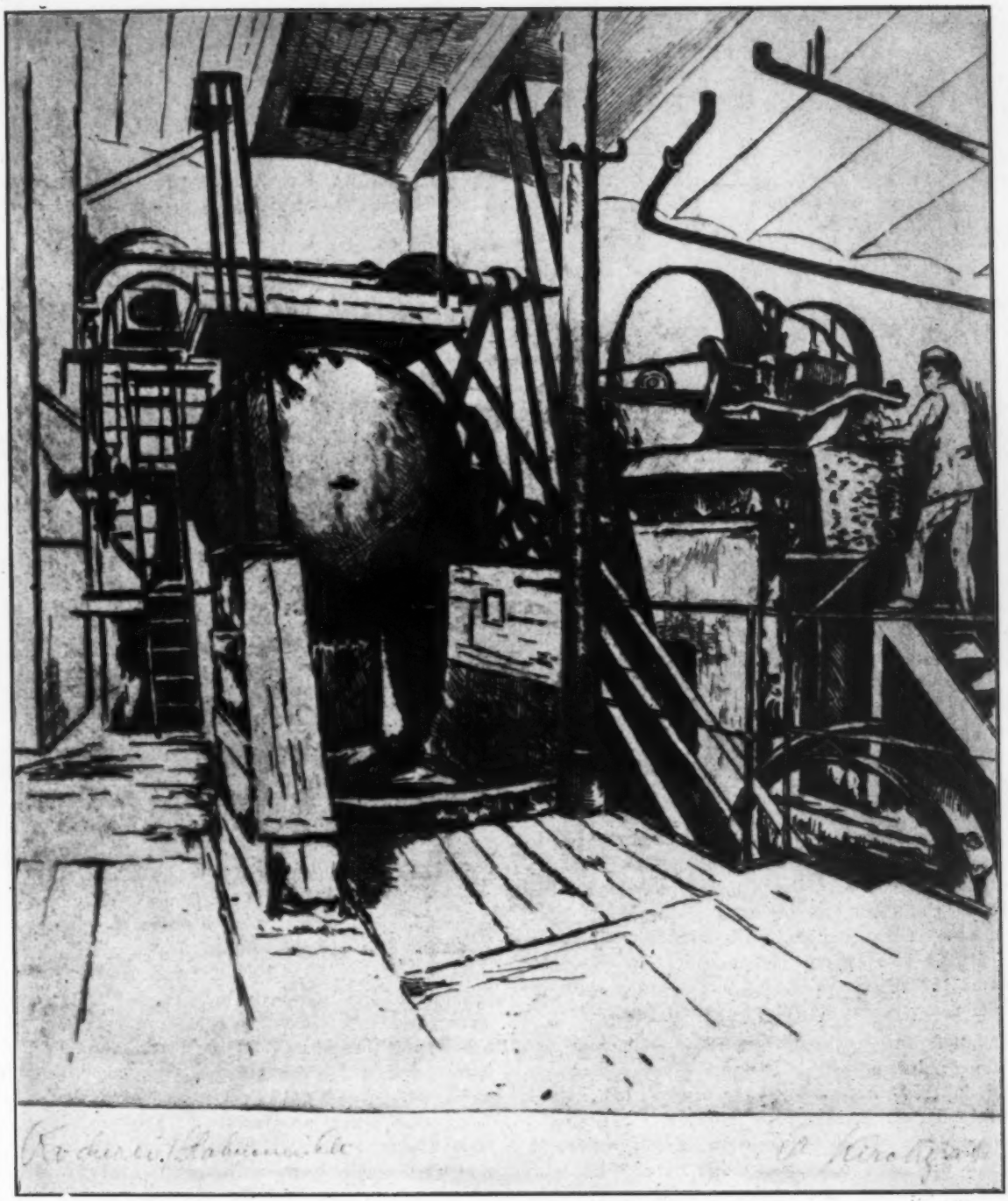
Another banana pulp specialist, Adolphe Roque, also used aloe in 1851. He hoped to substitute these materials for rags. But, as usual, the hope was hopeless. In Great Britain, that year, paper used in books paid a tax of 14 guineas a ton, one-fifth of the selling price of the paper. Algeria, in 1851, exhibited in London specimens of paper made from Mediterranean alfa fibre. Also, at that same exhibition, Nepal showed a large sheet of paper made from local vegetation in India, by a process introduced from China.

Tuscany had 20 mills that year, with 2 English machines at a mill near Florence. Switzerland possessed 26 machines, plus 20 vat mills. They totaled 11,607 tons in 1851. Men working on paper in Switzerland made 16 cents daily, women 11 cents. No paper was exported at all in 1851. Lombardo-Venetian kingdom in Italy in 1851 had 6 machines in 4 mills. In the other Roman States there were only 3 machines. Smyrna had 1 mill, 1 machine in 1851. Constaninople, also, in Turkey had one vat mill. That was all for the entire country. Egypt, near by, had one vat mill, at Boulac, near Cairo. Twenty-two years later, in 1873, the Khedive owned this mill, with 218 workers. It annually produced 165,511 reams for printing, 347 hundredweight for wrapping, at that later date.

In 1852, Great Britain made 154,469,211 pounds of paper. That was valued at two millions, sterling. And 7,328,886 pounds were exported, highest record yet in foreign trade. Mills in England were 304 that year, Scotland 48; Ireland, 28, totaling 380. These mills used 1,616 beating engines, and 130 more were idle. London Exhibition of Industry states, that year, that there were, really, in 1852, some 415 paper mills in all the kingdom, but that 35 were idle.

J. Mansell, in 1852, patented a method of ornamenting paper by producing a damask effect, resembling weaving. That was accomplished by passing the pulp between special plates. Jean A. Farina, of Paris, that year, made a pulp which was from the plant called spartum, or waterbroom. He used both stalks and the roots. At first, as usual, mill owners and workmen objected to handling this material. Yet it finally assumed important vogue in France. He also found that he could use 12 pound demy as a 14 pound demy rag. All this was known to the ancient Romans.

That year of 1852 was also notable for the G. W. Turner improvement to the paper machine. He made



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Rag Boiler, Hahnemühle

an endless wire webbing. This combined with, and passed around, the cylinder. It took the vat pulp to the dandy roller and pneumatic trough. This took the place of the fixed wire web and endless felt, in the cylinder machine, and the wire web for the pulp in the Fourdrinier. Turner also devised a method of passing the pulp through a trough of sizing, between two endless felts. This accomplished a more uniform and thorough saturation in the sizing.

Germany, that year, exported 40,000 quintals in paper. Only twenty years previously Germany had been an importing nation. In England, rags were

bought at 26 shillings for a hundredweight of first quality; 16 shillings for second; 11 shillings, 6 pence for third; and 7 shillings for fourth quality. England had few rags to export usually, seldom more than 500 tons annually. But, in 1852, fully 2,462 tons were shipped from Great Britian.

Spartum was now known as exparto, a substitute for linen. This was especially so in Spain, where it grew, profusely, upon the sandy coast. France, meanwhile, was excited about the new tax on paper. Mills said the new excise would not produce more than three million francs annually. Coupier & Mellier, at Maidstone, England, invented a new form of wood pulping. Boiling soda or potash lye was permitted to reduce the cut wood to pulp. Haiti exported 1,436 pounds of rags in 1852.

In 1853, a single sheet of Stirling paper, in England, was 3,000 yards long, 54 inches wide. It weighed 400 pounds. It required only three hours to make it, from pulp to paper, at a cost of £10. That was an example of the remarkable progress of the Fourdrinier, up to that time. Charles Knight, an English publisher in London, remarked that he had paid the Government, from 1833 to 1953, £50,000 as taxes on paper he had used in his books. And, that year, Great Britain made an average, for five years, of 151,234,179 pounds. This was a 20 year gain of 114%. Population in Great Britain, in that time, had not gained more than 16%. Annual average value of the paper was approximately £4,000,000. But the total for 1853, alone, was 177,633,010 pounds. That was another high mark. And the 13,296,874 pounds exported also was a record. Still, 200,000 paper pounds were imported. Consumption, therefore, was about 5.40 pounds per capita.

While, in France, in 1853, the production was 70,000 tons yearly. Population of France, at that time, was only 36 million people. But, somehow, they used 105,000 tons of rags. Six thousand of these tons were imported. Great Britain, with only 28 millions of people, used 90,000 rag tons annually. And they imported 15,000 tons of rags. Value of paper made in Britain now ran to $17,760,000, in our funds.

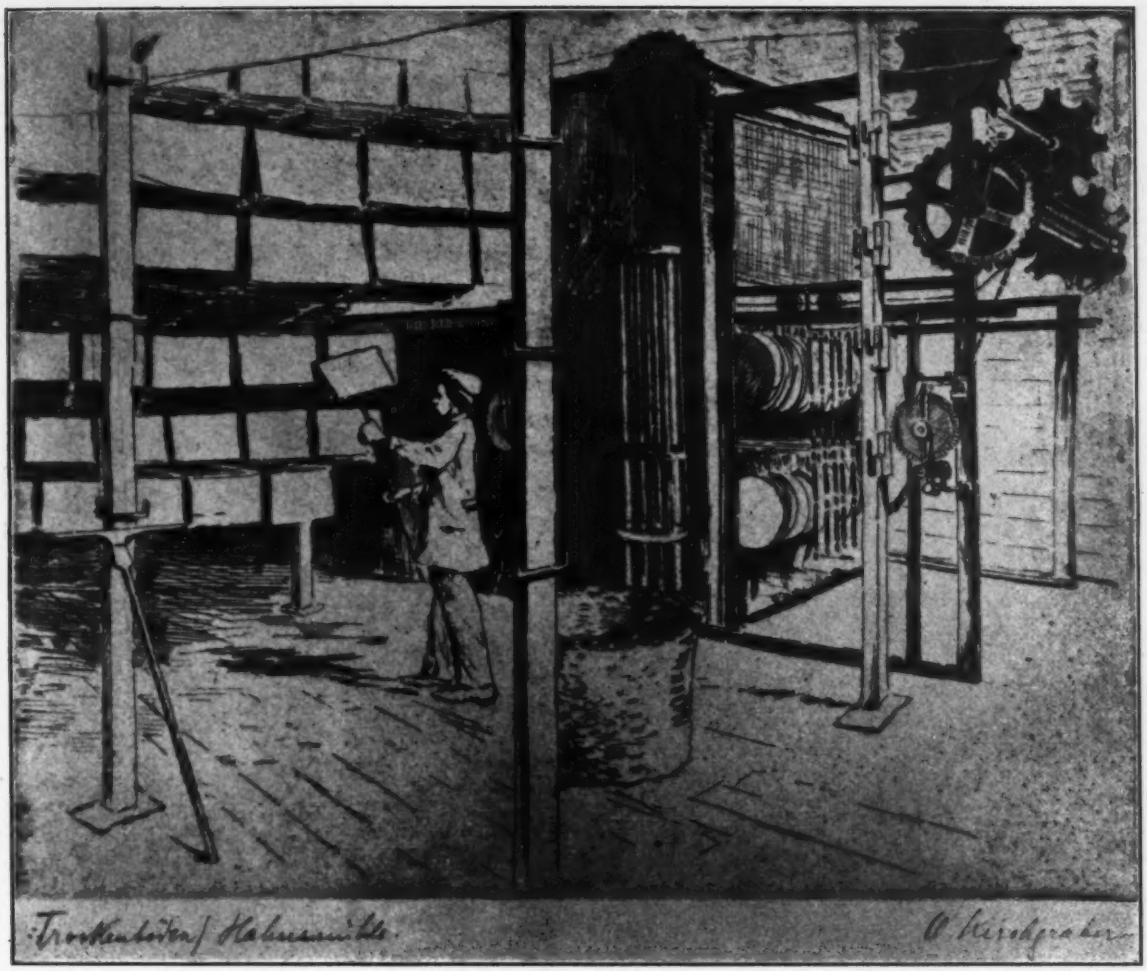
Watt & Burgess patented, in 1853, another way of making pulp from wood. It was first cut to shavings, and, in 1854, they patented the process, too, in the United States. In 1853, also, Brown & McIntosh invented hollow moulds. These were made of perforated metal, wire, and other material, covered with felt. Inside of these moulds the pulp formed a vacuum. This caused the pulp to be more uniformly distributed in layers on the felt. Coupier & Mellier, in France, that year, exhibited a straw paper, said to be of equal value to rag. And a German secured a patent in England to make wood into pulp. He used fir, pine, and willow trees in his pulp. G. Stiff, in England, also invented a process of lime water, in place of alkalines, to make straw, grass, and other pulp. France imported only 337,104 pounds of paper in 1853. But exports were now 17,053,667 pounds. With a total national production of 156,800,000 pounds, France used 140,083,447 pounds at home, or 3.89 per capita.

In 1854, Samuel Nolan and a Professor Antisel claimed to have invented a new paper machine, to reduce the high cost of paper, then said to be excessive. But English and total British production were still rising. That year, 380 mills consumed 201,000,000 pounds of rags. This was a boost of about one-half in twenty years. Some 177,890,000 pounds of paper were produced. And 16,112,000 pounds were still sent abroad. France used more rags than Britain, as the total there was 235,000,000 pounds in 1854. From this, 156,300,000 pounds of paper were made. Plantain paper was produced in England that year. In Paris, the Viviens made leaves into wrapping paper. Lime was used to reduce the pulp. Both Great Britain and France were now said to be using 436,800,000 pounds of rags annually. So they both totaled 291,200,000 pounds of paper. This was 4.55 per capita, while the U.S. had a per cap which was more than double, at 10.80.

In Holland, that year of 1854, the combined paper mill owners objected to the exportation of the free shipment of rags. Only 160 mills were represented, but they said the export of these rags was ruining their business. Other nations had either prohibited the export of rags, else had levied high duties. Kelin, in nearby Belgium, invented a straw conversion into pulp. Sixty hours were required to steep the straw in water, again washed with clean water. Then it was roller flattened, damp, cut into fibre, bleached by the sun. Again it was steeped for three or four days. Then it passed through a bath of hyperchloride of potash or soda, until white, then into the engine.

T. G. Taylor, that year, invented a hop plant pulp process in England. John Evans patented a Brazilian grass process for pulping. John Jeyes had one for pulp made from twitch, or couch, grass. These were both English ideas. E. Maniere produced a fireproof paper in 1854. He put asbestos, as a mixture, in the pulp. In France, they were still experimenting with wood pulp. This later method was pulping the wood in water for a week, dried, then reduced to powder. That process was then mixed with rags. White woods, like poplar, lime, willow were used freely. And a French mill exhibited in New York samples of paper made from straw which was said to be excellent. It was white, strong, and had finish almost equal to rag paper. Coupier & Mellier were the makers, and they patented the process in the U.S., also. Nearly 150 inventors had processed similar paper, but this method was best.

That year, 1854, Great Britain made 179,896,222 pounds of paper. That represented an increase of a hundred million pounds in twenty years. Exports were still climbing to 16,112,020 pounds. Two million pounds, sterling, was the total value. Rags in Britain had jumped to 120,000 tons. Three-fourths of these were imported. Italy and Germany led in this supply. England paid for rags in 1854 at 32 shillings for first



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Hanging the Paper to Dry
Drying Loft of the Hahuemuhle, with Paper Very Slowly Handled, Sheet by Sheet, As It Comes from the Mill

quality; 20 shillings for second; 15 shillings for third; 10 shillings for fourth grade. English demand for printing paper was so large, at that time, that the exports to Jamaica became so small two newspapers there had to reduce their number of pages.

R. & J. C. Martin received another English 1854 wood patent. They soaked their wood shavings, then ran the mass through a toothed cylinder, as with saw or rasp, reducing the whole to the required pulping. Alexander Brown, in England, also took out a patent on pulp made from fern or bracken. This seemed to be plentiful in Scotland. These plants were evidently strong in fibre, requiring less sizing, also. James Sinclair used thistles in England, that year of 1854. But the idea, actually, dated down to a century previously. C. Hill, that year, made paper from horseradish, rush, flag, and other substitute processing materials.

In Prussia, von Parmewitz made paper from pine. Red pine was used at Giersdorf. It was used for both writing and drawing papers. It required little sizing, as the natural wood contained much resin.

In the next year, 1855, Watt & Burgess again made experiments in England with wood pulp. They boiled it in caustic soda lye, washed free of alkalies. Then chlorine was used, or oxygenated chlorine, and again washed. This batch removed the hydrochloric acid, and the wood was again treated with caustic soda lye. At this time the pulp was suitable for the next washing and bleaching. It cost £24 the ton. If made of rags the cost would have been £40.

In this year, 1855, Henry Fourdrinier died at 90. He was the sole surviving partner of the famous brothers who bought the Louis Robert patent, and made the first succesful paper machines. He died in

St. Paul's Dome in London Outdone by Total Paper Used by "The Thunderer" (The Times) There

poverty, as he had exhausted his extensive original funds in continued experiments with the machines.

Duty on rags for export was abolished in 1855, in England. J. N. Nevin, in Scotland, succeeded in pulping paper from hollyhocks. It was more or less suitable for bagging and wrapping paper. It was clean, and it was strong. A French wall paper man made a design requiring 3,000 cuts, costing $10,000, while the design itself cost $6,000, then believed to be an excessive sum.

Another famed man in paper died in 1855. This was Joseph P. Hennessy. He passed at Brussells, aged 74. He was owner of extensive mills at La Huepe, in Brabant. He had radically changed Belgian paper production. For reward, he was given many gold medals at exhibitions. He said he was a descendant of Irish kings, his ancestors Jacobin emigrants. Rags in England were very scarce that year of 1855, according to no less an authority than the London Economist.

That "Old Thunderer," the London Times, famous for a generation and more in Great Britain, even in America, was using 9 tons of newsprint paper daily in 1855. They played this up, at the time, saying this amount of paper, in an approximate week, or eight days, would be as high as the equally famed St. Paul's Cathedral. Newsprint, at this time, rose in price a half penny a pound. And the Times was losing $10,000 annually on its newspaper sales. So they offered a prize of £1,000 for a solution of a new and available material for newsprint material, or pulp. Watts, an Englishman, at that time, perfected a pulp from wood and bran. This he offered to the Times as a way to save the $10,000—and more.

Austria, in 1855, was making a great quantity of paper in its 535 mills. They employed 12,000 workmen. Some 165 more mills were located in the so-called kingdoms and duchies of the German Zollverein States. It is believed, however, that these figures do not fully represent the totals in those countries, even ten years previously. Else machines had greatly reduced the number of operating mills.

Another seaweed inventor came to life in England in 1855 when G. Martonoi received such a patent for pulp. Egypt was exporting considerable rags, but, largely, to the United States. W. Barabee put perfumery into pulp. For this cosmetic art he secured an English patent in 1855. Drawback on the paper used in just printing prayer books and Bibles in England was £9,958; in Scotland, £2,088. Richard Herring issued a book in London in 1855 on ancient and modern paper production. In it were 25 paper specimens, and an engraving of the then proficient paper machine. Improvements and application of steam in paper production in Great Britain in 1855 had reduced the number of mills to 380. This was only one-half of the former total, twenty years previously. But rags had gone up to 201,600,000 pounds. This was a gain of 100% in consumption for production.

One year later, in 1856, there issued from London, under the name of T. H. Saunders, a book for the Paris Exposition on paper production. This included a history of the industry. It contained specimens of both hand and machine made paper. Also, advanced samples of notes issued by banks, paper for checks, photographs. And the preposterous sum of $1,000 was mentioned as the cost of the job!

That year of 1856, too, the drawback in taxes on religious books in England was £9,094; in Scotland, £1,200, just for the paper so used. Edward Grantless made paper of stone, he said, in 1856. He was a marble cutter, so perhaps he did, as anything could have happened in Glasgow, Scotland, at that time!

Another man in Belgium turned up with pulp, made from cuttings of tanned leather. This was Lasare Ochs, in 1856. Tannin had to be removed, first. Then 20% of hemp rope scraps were mixed in the pulp. Wrapping paper came out the other end, and of fair quality.

France now (1856) imported 23,000 tons of paper. This was valued, in our currency, at around $7,500,000. Exported were only 114 tons, to the value of $200,000. A great loss in the balance of foreign trade, indeed, for that period.

Francis Burke, at Montserrat, in the West Indies, in 1856, made pulp from tropical plants. Wells' Annual

Chlorine Bleach was used in 1856

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Does This Mill Still Exist?

One of a set of eight etchings by O. Kirchgraber, depicting the complete process of making paper by hand as carried on at the "Hahnemühle," eastern Germany. Inasmuch as the mill was close to the Polish border, it is thought that it no longer exists, although nothing definite has been heard since the close of the war.

of Scientific Discovery related the plan a year later. Pierre J. Davis, in Paris, found a new way to bleach paper in 1856. And still another man, H. Hodgkins, in Belfast, Ireland, had a method of his own. These were also related in the Wells' Annual. Didot, the man who had invented so many improvements for paper, in 1856 also discovered a better bleaching process, he said. He used chloride of lime, clear, then passed carbonic acid gas through the pulp.

Crowley & Sullivan also had, in 1856, another bleaching method in England. They bleached straw pulp with chlorine, at 1½ to 2 degrees on Twaddle's hygrometer. They had to be careful about the content of the bleach, as a stronger liquor would have injured the pulp, a weaker solution would have been useless. A reddish color of the straw indicated it was about to merge with white. So a jet of steam was slowly induced, and the two hour period of liquor to blood heat, 90 degrees, was kept two hours longer. Careful handling of the steam was necessary, else the batch would have been spoiled, also.

At Hong Kong, China, the Overland Mail was printed on a heavy paper, made from bamboo. That was in 1856, too. Pasteboard in England, at that time, was made from beet roots. Another attempt to make paper from maize, or Turkish wheat, was made in Bohemia by Maurice Diamont. He got the Government interested in 1856, and made some printing and some writing paper from this material. But the cost was excessive, being even more than that for rags. Three years later (in 1859) this was tried there again, with better results, but not yet on a par with rag pulp production. At Temesvar a mill was opened to cut the cost of transportation of the raw material, but the operation was far from successful, in the end.

In the following year, 1857, Russia reported 181 mills. They employed 11,730 people. Their production was valued at $3,250,000. A. C. Mellier, in France, put out a pulp boiled in a caustic acid solution at 310 degrees, Fahrenheit. This was after it had been soaked and cleaned. But it was previous to action with chloride of lime. It also had the use of a rotary container, separate from the steam vessel.

In Havana, Cuba, a company was organized with $400,000 capital to make Cuban paper. High cost of the paper was responsible for this enterprise, but no record is available as to its outcome in 1857. That year, too, the color of the paper of the Bank of England was an odd white. It could not be obtained, of course, elsewhere. It was thin, transparent. It could not be washed out by turpentine. Nor could it be scratched out. It was crisp and tough. So cashiers could immediately distinguish the true from the false notes, the paper was also water marked. These bank notes had deckle edges. This method was accomplished with two notes, placed lengthwise, then cut with a knife in processing. Resembling uncut paper, the notes prevented imitation after the paper was made from the pulp. All these British bank notes were made from new cotton and new linen. In its original waterleaf, or unsized condition, the note would sustain 36 pounds; plus one grain of sizing the note would carry 100 pounds in weight. And, also, £100, perhaps, in cash value.

L. C. Stuart, in 1857, improved sized paper in England. This he did by drying it over and between a series of oblong cylinders. These were placed one above the other. Their surfaces were punctured with small holes. Through these openings currents of graduated hot air were forced. So the heat came into contact with the paper from both sides of it. Then the series of cylinders and the paper were exposed to open air, so the vapor might escape. Therefore, the vapor would not again affect the finishing. Perforated cylinders were the secret of the invention, as the mills in England had previously used, of course, steam heated rollers to dry paper.

Bank of England's New 1857 Paper Astounded Counterfeiters

In 1857, also, the paper tax in Great Britain was three cents the pound. And 191,000,000 pounds paid that tax. In Vienna, that year, samples of writing paper were shown of Indian corn leaves, and of fine quality. W. E. Gaine, in England, patented parchment paper. His system included the realization that paper, when exposed to a mixture of two parts of concentrated sulphuric acid and one part of water, for just the time required to draw it through the fluid, would be instantly converted into a strong, skin-like material. Then it had to be quickly washed with water.

James Brown, in England, in 1857, pioneered in treating pulp with glycerine for better printing. A year later, in 1858, a man named Barry was prosecuted by the Crown because he had not taken out a mill license. That was on account of the fact that he was making paper from substitute animal material. Barry contended that his product was parchment, not paper. But the Court found for the Government, fining Barry £100.

That same year, also, the famed Thomas B. Crompton died, aged 66. He had made a fortune from paper, and from improvements on its equipment. He owned the great Farnworth Paper Mills. He also possessed a mill at Worthington. Supplying the principal newspapers and merchants of London, he also invented the continuous drying process, previously mentioned. And he owned the London Morning Post, also other newspapers in the kingdom.

Ladd & Keen, assignees of Watt & Burgess, in England, secured a patent on wood pulp in 1858. Charles Marzoni, assignor of J. Gandolfi, secured a patent on a stone called adamantine to reduce wood fibre into pulp. In Leipsic, the Booksellers and Publishers Union, in 1858, decided to erect a mill to make their own paper, as the monopoly in paper had increased prices to such an extent that they could not afford to buy it.

That year, too, 1858, the oldest rag picker in Paris died. Paris, long famous for its odd characters in rag picking, noted that this man was 91, and that he had, at one time, a fortune. He was respected by his craft, and his generous competitors reserved for him certain streets, upon which the picking was rather good. He was also given a small sum of money, each month, by his companions, for gin and for tobacco. His funeral was largely attended by rag pickers. And the contrast, at the time, may have been emphasized by the passing, in London, of the wealthy mill owner, Crompton.

In 1858, too, a water proof paper was brought into common use in England. This was covered with a very thin coat of rubber. It had been dissolved in turpentine and placed on the paper with rollers while in liquid. D. Lichtenstadt took out a patent in England, that same year, on paper from leather findings. Isaac N. Crehore and Francis Stiles invented an improved lead plate, of sheet metal knives, corrugated, at a series of angles or curved lines, for a rag engine. This better plate substituted for the one, then in use,

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Rag Cutter, Hahnemühle

This is a Rather Crude Contraption in Comparison with Our Modern American Rag Digesting Machinery. Now Used in All Mills.

that was subject to breakage, difficult to repair while in use of the mill.

In the fiscal year 1858, the Government of Great Britain found that there had been a decrease in production of paper. This was about a 6,000,000 pound loss. Figures, comparatively, were 99,483,635 pounds against 93,462,130 pounds for the current period.

Paper in Madrid, Spain, in 1859, was extremely scarce. Several newspapers had to suspend. These papers wanted the Government to permit the free entry of newsprint into Spain, or, at least, at a greatly reduced duty.

In 1859, too, the tax paid paper in Great Britain was 217,827,197 pounds. Exports were 20,142,350 pounds. F. de Compoloro, in France, in 1860, patented another Indian corn husk pulp. Jordan & Keney (in connection with Grant, Warren & Company) claimed a reissue patent for the improvement in machines in grinding and in sizing of pulp. These were conical grinders and outer shell, with pipes for rags and for sizing, built so simply that the process could be accomplished more readily. Thomas G. Chase, that year of 1860, claimed that non-corrosive paper could be made with a mixture of the pulp in calcined feldspar, sulphate of lime, metallic magnesium, calcium, and iron, between a block of caustic akali coated with paraffine and rosin, and the paraffine wrapper.

That same year, 1860, Ebenezer Clemo, in Toronto, Canada, made a compo of nitric acid with straw and grasses into pulp. Also, a subsequent treatment of a solution of hydrate, or carbonate of an alkali, to reduce stock to a finer fibrous pulp, and without using a beater, or any other mechanical operation.

In 1860, also, another fibrous plant, resembling flax, was used in Algeria. It was useful for manufacture of coarse linen, stronger than cotton. Its growth was encouraged in Africa to replace very scarce rags for paper. And a new cigarette paper was then found, too. Cigarettes were then just coming into a small popular demand on the Continent, later to be followed by a larger demand from the United States, as their greater production was recognized by the first American Civil War tax in 1863. In Algeria, again, a mill was established for this cigarette paper. In local consumption, then increasing, Algiers and vicinity (possibly also in France) nine to ten million francs had previously

Like a Serpent—But 4 Miles Long—This Tissue Roll Was Made in 1860

been used in rags for cigarette paper. Now, the local plan was to use leaves, stalks.

England, that year of 1860, was using 120,000 tons of rags. Imports were important to the paper industry, as, otherwise, not enough domestic rags could be obtained. In all countries of western Europe, inclusive of Holland, Belgium, France, Spain, Portugal, export of rags and other paper waste was prohibited. So rags were averaging three pence per pound in England, and not over 1½ pence in France.

English mills, also, battling paper duties in the House of Commons, brought about reduced taxes per hundredweight from £1, 3s, 4d on millboard to 16 shillings; on pasteboard, from the same rate, to 15 shillings; on brown paper, same rate, to 16 shillings; on wall paper, £1, 3s, 4d to 16 shillings; on waste paper, same as previous, to 16 shillings, too. That was accomplished in the session of 1860. Previous rates had, actually, been in effect since the days of Queen Anne.

That same year, 1860, a single sheet of tissue, in England, was shown that measured four full miles, about 21,000 feet. And it was six feet, three inches wide. But it only weighed 196 pounds. It was made in just twelve hours, of course, by machine. Quantity of paper supplied to the London stationery office, in the fiscal year ending March 31, 1860, was 3,601,119 pounds. By reducing the tax, as just mentioned, the comptroller figured the Government saved £12,000. Or did it? Anyhow, the sales of waste paper, in that same period, amounted to £6,269. That was just £1,000 more than in any previous year, reported the London Booksellers.

J. L. Jullion, of Aberdeen, Scotland, in 1860, took out a patent on chemicals with which to improve paper processing in the United States. His idea appeared to be a paper that would more quickly absorb inks.

In the next year, 1861, in Europe, 60,000 tons of kaoline were used. Barne & Blandel, of Nantes, France, experimenting with wood fibre, used nitric acid. This acted on wood with the addition of heat, making the fibre and resulting pulp more pliant.

In 1861 the notable event occured in England of abolishing the entire tax on paper and its products. That included both domestic and import taxation, says the London Publishers Circular.

That same year Benjamin Lambert in England invented a method to remove ink from printed paper, and thus improve the pulp for new stock. Moritz Diamant, in Austria, invented a method for making corn leaf pulp. But this was, and is, an old plan, repeatedly followed by both old and new inventors. At the imperial mill, at Schlogelmuhle, the success of the invention was acclaimed. And a better than rag paper was made there, said the Scientific American.

In 1862, William McFarlane directed attention of the trade to the use of sugar cane stalks as pulp for paper. For every 2,200 tons of it, he said, 2,000 tons of finished paper could be obtained. Cost, delivered in London at that time, was figured this way: Workman, £200 for one year; fuel, £1,000; capital invested, (£300) which, at 10%, was £30; depreciation, £30; freight, £7,000; profit, £10. Which, to say the least, did not allow much velvet. Price of 2,000 tons of pulp of this material was believed to be £14,000. Or about £7 the ton, which was less than one-half the cost of rags.

On June 27, 1862, a famed writer on paper died in Paris at 59. He was Louis Piette, editor of the Journal de Fabricants des Papier. He had published, in 1831, a treatise on paper. That went through several editions. Then he wrote a book on coloring pulp. This was published, but after his death, with 229 specimens of colored paper. He was a lawyer, yet devoted his life to the paper industry. He had received awards in England, Germany and France for his work. For thirteen years he had exhibited his craft at industrial exhibitions.

Corn husks were still inducing mills in Austria and in Switzerland to produce paper. In 1862 the London Mechanics Magazine said the movement was engaging

Cigarette Paper, Improved, Focused Attention on Cigarettes in 1863, as the First U. S. Tax Was Placed On That Then Comparatively New Smoking Product

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Dandy Rolls Made Watermarks More Perfect in Detail

the attention of some mills, exclusively. Russia, in that year, produced paper of the value of 5,680,000 rubles. Kolesoff reported that 12,000 paper workers were then employed there in 165 mills. But this may have been an error, as more than 72 workmen to each mill showed over staffing. And the product would be only $317.50 for each workman, a very small output, in value. At the same time, Russia almost invariably showed such a large percentage of workers in nearly all mills, and in other years, also.

H. D. Pochin, in England, said he could use the following sizing in 1862: 150 parts of rosin, 75 soda ash, (with 46% akali), making a rosin-soap by beating and by grinding. Then take 10 parts of this resulting rosin-soap and 18 parts of ammononiate of alum, and form the solution for ordinary paper. For finer paper, the rosin-soap was 165 parts rosin, 165 parts soda ash.

In 1863 a safety paper was invented in England. This paper was for the ultimate purpose of stopping forgeries of bank notes. Or of any other paper for security purposes. Single sheets of various layers of pulp, one imposed upon the other, and of various kinds and colors, according to the purpose, were to be used. Inventor Henry Watson, of Newcastle-on-

Tyne, and Joseph Millbourn, of Dartford, England, in 1863 invented a pulp strainer.

Esparto grass was now (1863) being imported for England up to 18,000 tons annually. This caused the use of an additional 4,000 tons of soda ash and other bleaching powders. Newsprint was consuming much of this type of paper. Cheaper grades of paper contained only one-fourth of rags vs three-fourths of esparto or alfa fibre. John Cowper, the inventor, made another improvement in the reduction of rags and waste. He invented an endless feeder. Flutted rollers handled the material, going to a rotating cylinder with sharp teeth.

Sellers, that year, made experiments with potatoes for base pulp. William Boaler, the same year of 1863, created at Manchester, England, a better dryer fabric. This was a superior cloth for replacement of dryer felt for absorbing excess moisture.

Another safety paper was devised in France. Joseph P. Olier, in Paris, produced a U. S. Patent, too, for three paper layers, of various thicknesses, with the center layer a colored paper. Outside layers were coated with silicate of magnesia and other chemicals.

In the very next year, 1864, the French Customs showed the export returns for the first five months of three years as follows: 1862, paper and pasteboard valued at 6,156,000 francs; 1863, 6,993,000 francs; 1864, 8,159,000 francs.

Paper mills of England, also of the entire kingdom, presented to Parliament in 1864 a petition requesting foreign reduction of taxation. Some 211 operators, representing 271 mills, asked attention to the numerous objectionable tariffs which had been imposed on exports to Britain. In Italy, for example, the duties had been doubled on rags from various districts. In France, and also in Belgium, a duty of £5 the ton had been placed on rags, which the British mills sadly needed. In Holland, too, the duty on rags was £4 the ton; in Prussia, and other German States, £9 the ton and more; in England, the export of this basic material was free.

Perhaps, partly due to British foreign office action, as requested previously by the British mill owners, Russia in 1864 cut its duty on rags, exported from the western frontier, one-half; from 14⅔ francs to 7⅓ francs the kilo. But the English mill owners, again, made complaint about the recent commercial treaty with France. Tax of 12% had been applied to rags exported from France, much to the damage of British paper mills. But Britain continued to import vast quantities of rags. In the year preceding, Britain had brought 4,215,630 kilos of rags across the channel.

Makers of straw paper met in France in 1864 to form an association at Avignon. Also, to establish minimum prices. They decided to increase their prices one to two francs the 100 kilos. That was about $2 to $4 the ton, at the time. Other district manufacturers of paper met, again, at Avignon. They, also, agreed to increase prices two francs on thick, and four francs on thin, paper per kilo. A later meeting in Paris brought all these mills together, and new trade arrangements were made.

World consumption of paper, according to Journal des Fabricants de Papier, was, in 1864, 31 to 32 million quintals. England was credited with 15 millions, or approximately half of this huge total. France with 5 millions, Germany at 1 million, Austria ½ million, balance of the world, inclusive of the U. S., 10 millions.

In 1866, Great Britain manufactured 28,500 tons of paper monthly. Imports for France in the next year, 1867, were 296,637 paper kilos, rags, 5,136,569 kilos. Exports were 4,918,520 kilos of paper, 1,429,055 kilos of rags. Still searching for rag substitutes, the trade was then using abroad (also in U. S., to some extent) abacca, which is Manila hemp; Cuban agave; Haiti hemp; Indian hemp; cotton; acacia; aloe fibre; Spanish broom; silk weed; hops; nettle; jute (Bengal hemp); Chinese hemp; mallows; mulberry, New Zealand flax; esparto grass; linden (basswood); yucca; bamboo; and many other things. French demand had increased so at home that many new mills were immediately built.

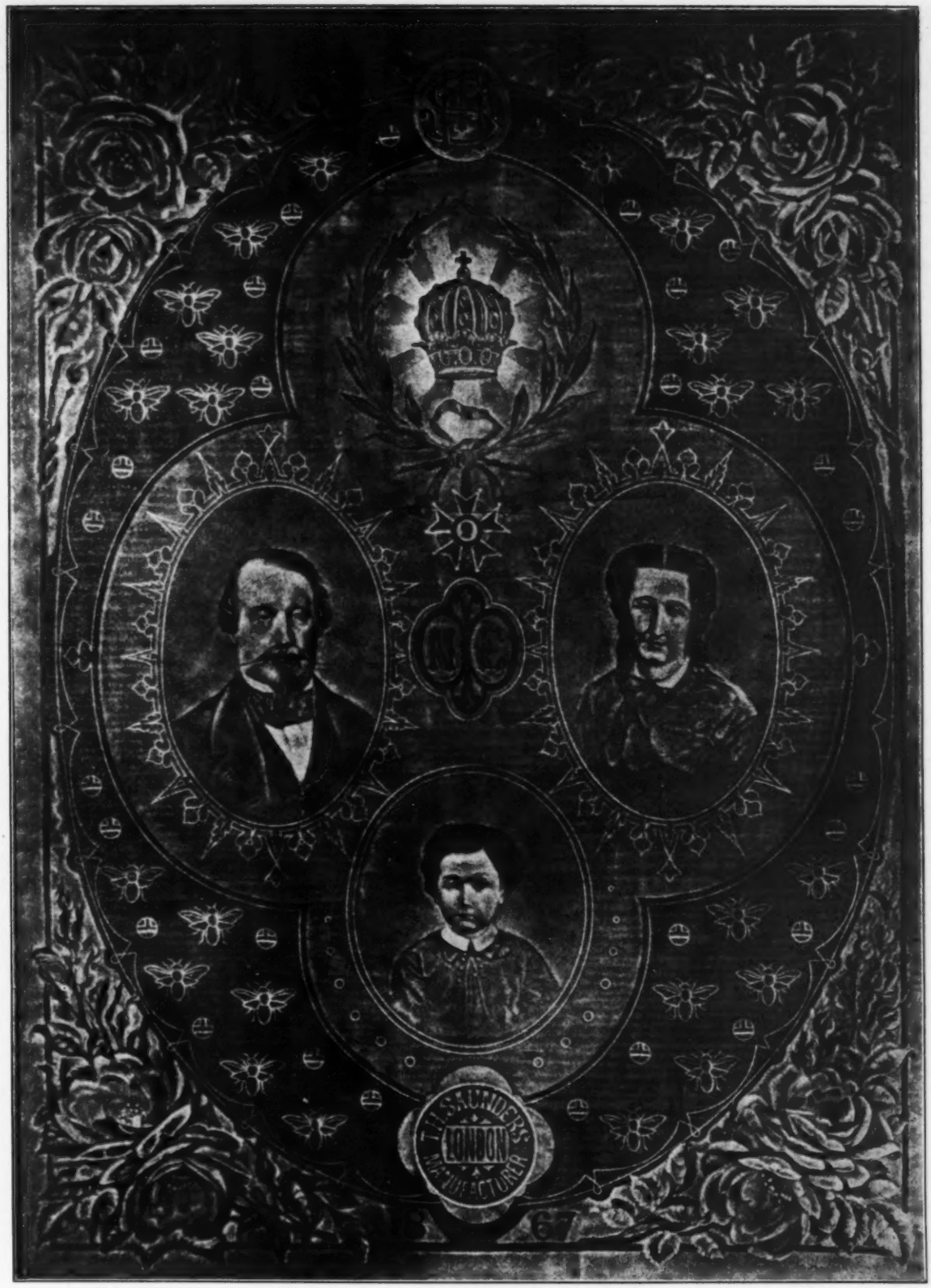
T. H. Saunders, a wizard at paper perfection in England, along in 1867, exhibited from his Dartford mill some extraordinary water marks. They were shaded and most artistic. Formerly, only crude wire marks were used, apparently of ordinary design. Saunders wanted something better, and made it. Incredible to believe, though, is the fact that there were still 140 firms in France making hand made paper.

In the following year, 1868, price of rags in Russia jumped fully 100%. France was using about 195 million pounds of paper in that year. England consumed 220 million pounds. Meantime, the United States was forging ahead rapidly, and was said to be using twice the paper bought and sold in both France and England, or around 440 million pounds.

Greece, at that time, didn't have a single mill. All the paper used in that ancient land was imported from nearby Italy, or from the more distant France, even from England. But Greece accumulated rags. These were sold to France and England, almost in exchange for manufactured paper, and to the total of some 12 thousand tons annually. They were collected, diligently, by 400 busy rag pickers.

Even though France was an important exporter of paper in 1868, some 348,164 kilos were imported, too. Imported rags, altogether, totaled 4,699,155 kilos that year. But the exports were much larger than the imports, being 4,828,944 kilos. Also, France sent 1,503,134 kilos of rags abroad. It was thought huge, at the time, that 27 tons of paper a day were used in Paris for local newspapers, inclusive of magazines, pamphlets. But the old London Times used 11 tons daily.

Germany, for the total empire, had 242 mills in



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Watermarked portraits of Napoleon III (1808-74), his wife, and their 11-year old son, Eugene Louis Jean Joseph. This elaborately watermarked paper, made by Saunders, London, England, for the Exposition of 1867, is one of the largest of the finely watermarked papers, measuring approximately 30 by 40 inches.

1868. They made 80,000 tons of paper. Even Australia started to make paper. Writing and printing paper was made near Melbourne in 1868, on the Yatra River. Previously, all their paper had come from Europe and the United States.

Peculiarity of the year 1869 was the gradual accumulation of paper oddities. Paper collars were then in use, also paper shirts, vests, hats. One inventor, Szelelmey, even made paper coffins! He believed he could make paper do for armorplating of war vessels, railroad cars, piping, wallboard. In fact, Szelelmey's paper coffin, the Zopissa, resembled ancient mummy cases of the Egyptians.

Paper aprons were used by women that year. Even newsgirls, in London, used paper aprons to emblazon the titles and contents of the newspapers they carried. Paper grass, in England, was grown to supplant rags. A full ton made a half ton of paper. Dr. Matthiessen made English paper from sawdust, shavings. Transparent paper, for tracing, was made by bathing it in benzine. After evaporation, the paper again became opaque, being thicker and tougher than the previous tracing paper.

That same year, 1869, in France, imports were 414,457 kilos. Imported rags were 4,507,585 kilos. Exports reached 4,739,269 kilos of paper, 2,549,511 kilos of rags. But total exports were decreasing, imports were increasing, as compared with other years.

India then offered fibre for pulp from the tchuma, of Assam. From Malay came the ramee, brought originally from Java to the United States, too. China supplied the rheea, strong and lustrous, but it cost more. India also supplied the jettee and moorva, while silk grass, so called, came from the Philippines.

Paper mills in England, in 1870, advanced paper 10% in price. Rags were so expensive, then, that something had to done, they said. And 100,000 tons of esparto were being used in England for cheap paper. It was worth £10 the ton, advancing sharply from £4. In France, too, the demand for paper became so great that all printing paper was scarce.

Use of esparto in England, in 1870, was bad for the rivers, as it polluted the water. Complaints were made by citizens near the mills. In Holland, there were 156 mills that year. Production in France hit 180 million kilos. Great Britain had 344 mills, with 456 machines. Of these, England had 271 mills, 352 machines; Scotland, 53 mills, 77 machines; Ireland, 20 mills, 27 machines. Some 14,547 males were employed in the British mills, 13,503 females, or a total of 28,050.

London Newsgirls Wore Paper Aprons in 1869

Sponge paper was made in France in 1870. It absorbed water, and was an immediate novelty. It was used, too, for surgical dressings. But the Franco-Prussian war had completely stopped the export business in fancy writing paper. Prices, at home, advanced 10%. Fact was that the French previously had a practical monopoly on fancy paper. Snowflake and frosted papers had been the vogue in France, even abroad.

In 1871, Great Britain was said to have 408 mills, France 276, Germany 243, Austria 78, Russia 40, Italy 30, Belgium 26, Spain 17, Switzerland 14, Sweden 8, Turkey 1. Total European production, that year, was claimed at 8,956,000 hundredweight. It had a value of £15,004,400. But the veracity of these figures was seriously questioned by countries claiming to have more mills, greater production.

In Japan, it was the custom for each family, engaged in the paper trade, to make its own distinctive paper. Much hand made paper, of good quality, of many varieties, and of numerous novelties, was made in Japan in 1871. But the Japs wanted machinery, and they came to the United States to get it.

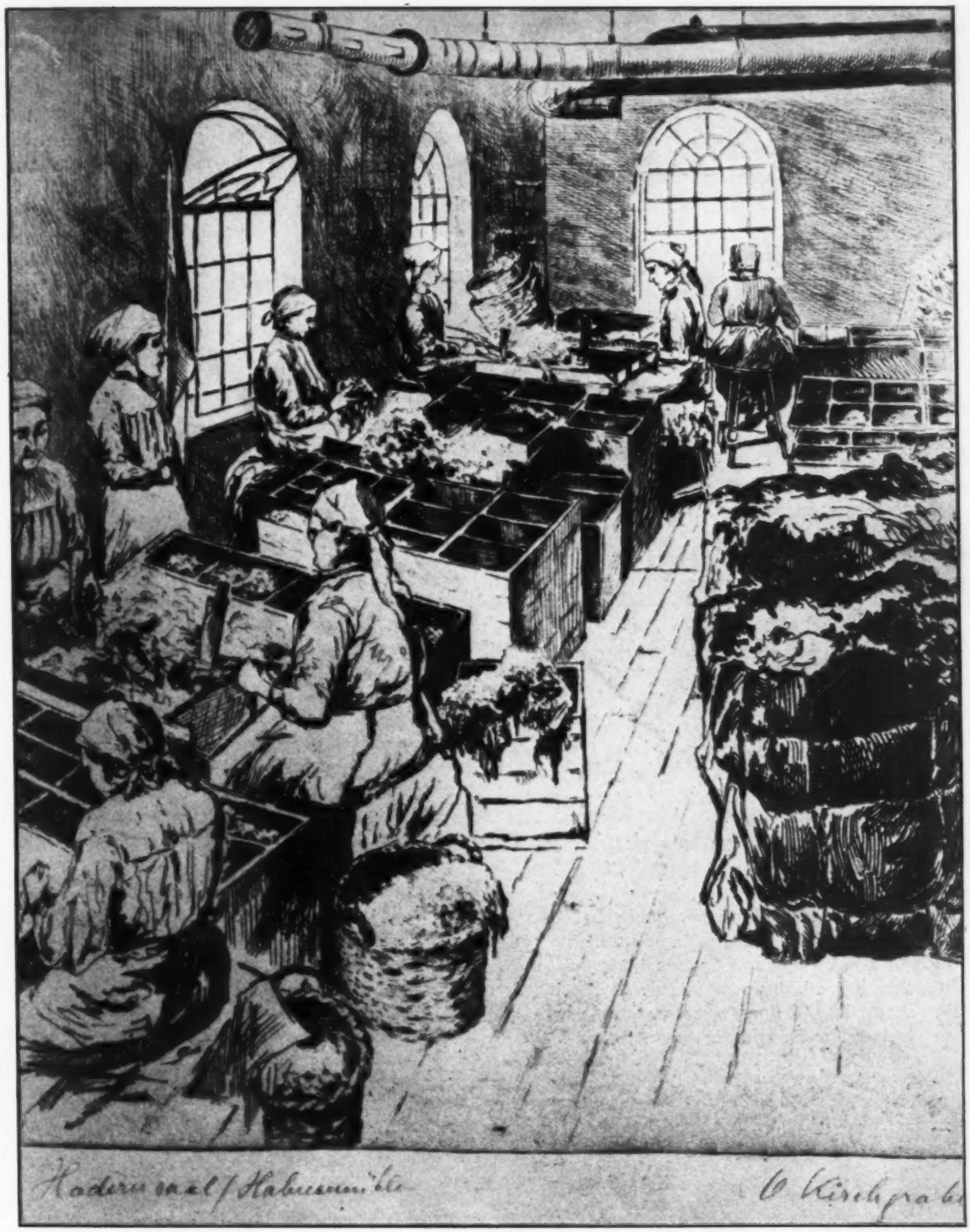
Ordinary speed of the Fourdrinier machine, as improved in 1871, was sixty to eighty feet per minute on printing paper. But a still later model was able to make the then astounding total of 175 feet a minute, or 25 tons of the paper each week. Lloyds, publisher of the London Weekly News, built a mill for their own paper. They had purchased 180,000 acres of Algerian land, to get esparto grass for their pulp. They even had their own ships, then an innovation, landing at their mill doors in Medway.

Yeddo, in Japan, made 263 different varieties of paper in 1872. Japanese paper handkerchiefs were then a novelty in Europe. But Europe was having its paper difficulties. Rivalry between France and Germany was keen, and the Franco-Prussian war emphasized this. Germany, being victorious, took the export business of France with Switzerland, Italy, Spain, Belgium, Holland, India, America, and even to Japan. England, too, wanting paper made by the mill of Prince Bismarck in Prussia, found it impossible to get enough of it. This was a fir pulp base. Pasteboard was also made at that Varzin mill from pine. Only 600 cords of the wood were used annually, but this was stepped right up to five cords daily.

Forerunner of Canada's vast newsprint business was the mill at Bedford, Nova Scotia, in 1872. But England stuck to esparto. It increased its 1872 imports to 130,000 tons. Imports of paper to England, in only

Rag Room of the "Hahnemühle," an Etching by O. Kirchgraber

Showing the Vast Amount of Hand Work in This German Mill. Rag Stock Is Thus Slowly Handled, Piece by Piece, Rag by Rag, in This Laborious Manner by Numerous Low-Wage Workers, Women, Both Young and Old.



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

In the King's Own Kew Gardens Grew Papyrus In 1874

the first seven months of 1872, were £124,277 over the same time the proceding year, 1871. Exports rose to £173,130.

In the next year, 1873, there were 350 mills in Great Britain. They employed 30,000 people. More than 300 million pounds of paper were made, said the Post Office Directory. Greece continued to export rags to England, also to France. This year 12,000 tons were shipped. Bleaching materials, coal, other items, were advancing rapidly in England. This made the paper cost fully £8:1s:3d the ton more. But paper rose only half that, or about half a penny per pound. In Scotland, the Dundee Advertiser published the fact that its newsprint was made of jute pulp. And the publisher offered a £50 prize to encourage improvement in the quality of it.

Turkey was exporting a quantity of rags in 1873. Some 7,507,967 pounds were said to have been shipped in the '72-'73 fiscal year. And, in England, the machine improvement was such that William Chadwick & Son, at their Pendleton mill, made paper 113 inches wide, and on a 120 inch machine. That was about 24 inches wider than the usual machine. In Chile, the Government granted an exclusive right to a mill to make newsprint and wrapping paper. Prohibitive duties were placed on such paper by Chile.

Italian mills had many foreign workmen. In Russia, Englishmen were running the mills in 1874, with the addition of a few Germans. German States had 423 mills at this time, which was a net gain of 181 in six years. Some 180,000 tons were produced, in all. France had 404 mills, with an output of 2,960,000 hundred weight. Great Britain had 274 mills, with 3,600,000 hundred weight output. But the United States then had 467 mills, with 3,230,000 hundred weight. Scattered throughout the world were 414 more mills, and the grand total of all world mill output, that year, was 17,819,000 hundred weight of paper.

Odd fact, that year, was that papyrus, long obsolete, was still cultivated, as a rare plant, in the royal Kew Gardens and in the Royal Society's garden in London.

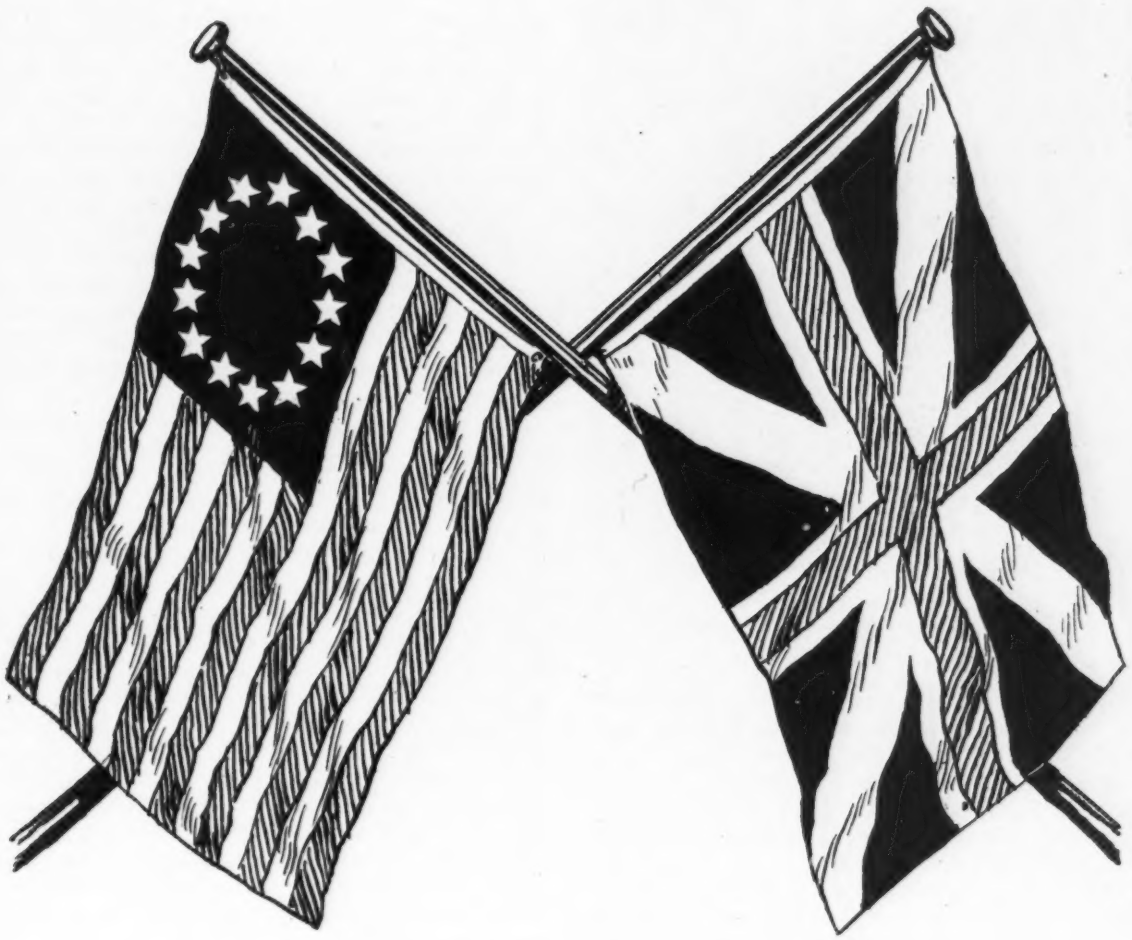
And the next year, 1875, paper specimens were shown in France of gombo, from the French colonies. It was estimated, in 1876, that there were 1,300,000,000 people in the world. Of these, 360,000,000 had no paper at all. And that 500,000,000 Mongolians made paper from stalks and leaves. Also, that fully 10,000,000 people used wood to write upon. And that 130,000,000 in the East and Near-East, had paper made from cotton. While the balance of the peoples of the world, say 300,000,000, had the usual paper of the world at that time. It was then estimated that 1,800,000,000 pounds of paper supplied the so-called civilized races, while the per capita output was only six pounds the person. But that figure had showed an increase of two and one-half pounds per head in fifty years, from about 1825. An estimated 200,000,000 pounds of rags were used, plus, in 1876, made in 3,960 mills. Then employed were 90,000 men and 180,000 women. Writing paper accounted for 300,000,000 pounds annually; printing paper 900,000,000; wall paper 400,000,000, with 200,000,000 pounds of miscellaneous paper.

It is evident, at this time, that the European, and what was known of the Asiatic paper situation, was at a high point of development. In mills, in production, in value, in people employed, the paper industry of the rest of the world appeared to be at the century mark. But the next twenty-five to fifty, and especially to almost seventy-five years, were to be the basis of the paper story, now greatly influenced by what occurred in America. For it was America that was forging ahead, out of all proportion to its then rather limited population. New uses of paper, new paper for those uses, and with the tremendous strides in newsprint, magazine, book and other production, were to make the American scene the most important for the paper makers of the world, not only for America, itself.

Too, the gradual event of modern advertising was to enhance the use of paper, and in every way. This is demonstrated in the next section.

CHAPTER V

To America, Then, Came Paper



From British Colonial to American Transition the Infant United States Paper Industry Rapidly Developed

PAPER, in the general sense, is not a new, modern-day product, as are the automobile, the radio, and the airplane. As a matter of fact, it is an extremely ancient product, known to have been in use in China at a time contemporaneous with the birth of Christ. Exact date of its first usuage is in dispute, some historians contending that the Chinese were making paper as early as 123 B.C. and others claiming that Ts'ai Lun, a Chinese, invented the paper sheet in 105 A. D. Be that as it may, it is still true that the first paper was made in China approximately 2,000 years ago.

In the earlier sections of this brief history of paper we have pointed out that from China the knowledge of paper making traveled gradually westward to Samarkand, where the Arabs are said to have learned the art from Chinese prisoners about the middle of the eighth century. By the end of that century, the craft was being practiced in Baghdad and Damascus. By 1100 A. D., it had found its way to Morocco, whence it extended into Europe through Spain—or it may have been carried directly to Spain by the Moors. In any case, by 1150 paper making was being practiced in Spain, by 1189 in France, by 1320 in Germany, and by 1494 in England. Almost 200 years later, paper making was introduced into the United States by William Rittenhouse. One or two of the dates within this trend

Site of the First Rittenhouse Mill, Paper Mill Run, Germantown, Pennsylvania, in 1690

are sometimes in dispute, but, in general, they reflect the route which paper making took, from its start in China, to its introduction into the United States.

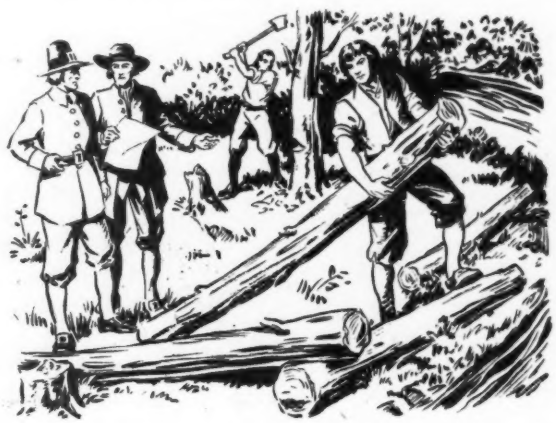
Manufacture of paper was established in the United States in September, 1690. Thus, nearly a century before this country came into being as an independent nation, William Rittenhouse and three associates, Robert Turner, Thomas Tresse and William Bradford, founded and operated the first paper mill established in the Americas, and the location was in what is now Fairmount Park, Philadelphia, Pennsylvania.

Paper making was not an early occupation of the American colonists. Clearing the wilderness, trading with the Indians for furs, making farms, establishing towns and villages—these were the tasks that, in the beginning, pressed most upon the attention of the settlers. Paper was not as yet a vital necessity. Newspapers did not exist until after 1700. There were few books, except those brought from abroad. A printing press was set up in Cambridge, in the Massachusetts Bay Colony in 1638, and others in Boston, New York and Philadelphia before the end of the century. But the printed output was small, less than one thousand books and pamphlets in sixty-two years, 1639-1700. Correspondence was not extensive, and writing was largely left to the ministers and the officials. Our demands for paper were to arise in the years to come. Our needs were altogether easily supplied by importing from England and Holland.

Even the starting of the first paper-mill, in 1690, does not seem to have been a result of any urgent call from the community. Rather, it came out of a single printer in Philadelphia, and the ambition of a newly-arrived Dutch paper-maker. Printer and paper-maker made an ideal partnership for establishing an infant industry in a field that had not yet been entered upon.

Actual beginning of this new enterprise in Philadelphia in 1690, Turner, Bradford, Tresse and Rittenhouse entered into an agreement with Samuel Carpenter for the lease of a tract of land of twenty acres on the banks of the Wissahickon creek for a site. The mill was built the same year, but the title to the land was not passed until February 12, 1706, by which time William Rittenhouse had become sole owner. By the terms of the lease, for nine hundred and ninety years from September 29, 1690, an annual rental of "five shillings sterling money of England" was to be paid. The mill stood in a little ravine on the banks of a stream, called Paper-Mill Run, that emptied into the Wissahickon creek, through Germantown, now a part of the city of Philadelphia, about two miles above the junction of the Wissahickon with the Schuylkill river.

In a modest way the mill was a success from the start. If it did not indeed "fill a long-felt want" it was, at least, promptly recognized as an interesting addition to the industrial life of the colony. In the following year a new mill was built a short distance from the site of the old one. In 1706 William Rittenhouse deeded to his eldest son, Claus, a three-quarters interest in the mill, and, when he died in 1708, the remaining quarter went to the same son. Claus Rittenhouse thus succeeded his father, and became the second paper-mill proprietor in the colonies. He continued to make writing, printing, brown and blue papers and pasteboard, supplying Bradford in New York, and the home market in Germantown and Philadelphia. Upon his death the mill became the property of his eldest son, William, whose brother, Matthias, carried on the manufacturing there until 1730. In subsequent generations the building was reconstructed, in whole or in part several times, but continued to be used as a paper mill. Finally, however, it was converted into a cotton mill. Later, the site was incorporated in Philadelphia's Fairmount park.



First Paper Mill in America Laboriously Built by William Rittenhouse in 1690

In a later generation a third mill was built farther down on Paper Mill Run by the third William Rittenhouse. This building remained standing nearly to the close of the nineteenth century. Other mills were erected in the vicinity, one on Paper Mill Run, and two on the Wissahickon creek, all operated by members of the Rittenhouse family.

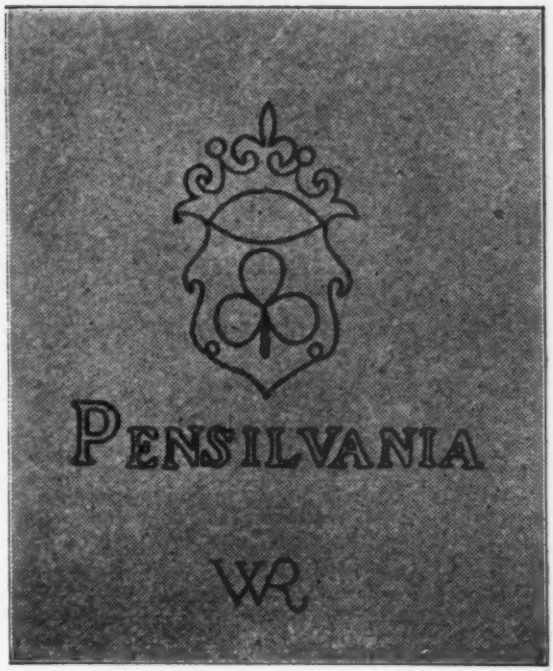
Neither the capacity of this mill nor the quantity of paper actually produced is known. All was handwork, and each sheet was made separately. Several days were required for the finishing of a sheet of dry, perfected paper.

"A day's work for three men was four and a half reams of newspaper 20 x 30. So there might have been made annually at the Rittenhouse mill from 1,200 to 1,500 reams of paper of all kinds, but this is mere conjecture. Small as was its capacity, it was all important to the community at large, for the home supply of Pennsylvania was dependent on it."

Most, if not all, the paper made in the Rittenhouse mill was water-marked. First water-mark used was the single word "Company." The second was a double: on one-half the sheet was the monogram W R, and on the other half a shield, surmounted by a fleur-de-lis crest, bearing on its face a clover leaf—which was the town seal of Germantown—and beneath this the word "Pensilvania,' in black letters. Another mark was K R, the initials of Klaas (Claus) Rittenhouse, and later was J R for Jacob Rittenhouse, grandson of the founder. These marks were on correspondence sheets, books and newspapers of the first half of the eighteenth century, and later. William Bradford, for his New York Gazette, established in November, 1725; and Andred Bradford, his son, for his American Weekly Mercury, of Philadelphia, established in December, 1719, the third newspaper in the American colonies, used Rittenhouse paper thus water-marked.

Second paper-mill in the colonies was a direct outgrowth of the Rittenhouse mill. It was built in 1710, by William De Wees, on the west side of the Wissahickon creek, in that part of Germantown then known as Crefield, not far from the Rittenhouse mill.

An Early American Watermark



Original Watermark of the Famous William Rittenhouse Paper Mill in Germantown, Pennsylvania

First historian of American printing wrote that, as early as 1728, William De Wees and John Gorgas had a mill on the Wissahickon, where "they manufactured an imitation of asses-skin paper for memorandum books, which was well executed." In support of this statement it was added that:

"John Brighter, an aged paper-maker, who conducted a mill for more than half a century in Pennsylvania, and who gave this account, observed that this kind of paper was made of rotten stone, which is found in several places near and to the northward of Philadelphia, and that the method of cleaning this paper was to throw it into the fire for a short time. when it was taken out perfectly fair."

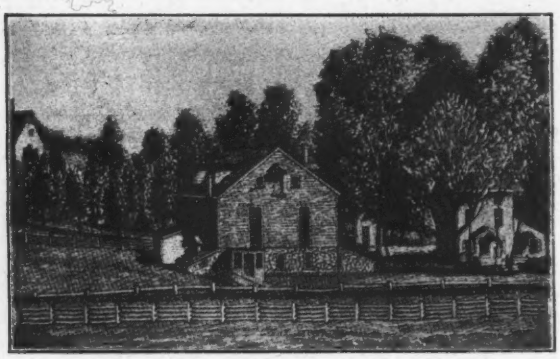
This description would seem to indicate an asbestos paper, such as Kircher's in Germany.

Nearly forty years elapsed before the third Pennsylvania paper-mill came into existence. This was in the township of Concord, twenty miles from the city of Philadelphia, on the west branch of the Chester creek, in that part of Chester County which afterward was Delaware County. In 1726, Thomas Wilcox and Thomas Brown built a mill-dam on the west branch of Chester creek, leasing land for the purpose on agreement to pay "yearly & for every year ye sum of one shilling of current lawful money of this province." On this land, in August, 1729, Wilcox built a paper mill, and entered into partnership with Brown to make and sell paper. Wilcox had learned paper-making in England, before he came to America, and the arrangement was that he should receive three-fifths of the profits of the joint undertaking, in consideration of

An Entire Day's Work for Three Men Was 4½ Reams of Newsprint, 20" by 30" in 1708

instructing Brown, who, evidently, knew nothing about the business.

First output of the Wilcox mill is said to have been fullers' press board. Later, printing paper was made, some of it for Benjamin Franklin, who became a close friend of Wilcox, and much interested in his undertaking. After 1775 the mill was devoted almost entirely to making government paper for continental bills, loan certificates and bills of exchange. Ultimately, its product was principally banknote paper for the United States and various individual States, banks, foreign countries, and private individuals. At the time



(Courtesy, Ashmead's History of Delaware County, Pennsylvania)

This Was the Willcox Ivy Mill of 1792-1866

of the revolution and before, the government authorities depended entirely upon this mill for paper for currency purposes, and placed implicit confidence in it.

As has already been shown, three mills alone represented the infant industry of paper-making until well into the second quarter of the eighteenth century. A growing need for paper existed, such as even importation was not able adequately to supply; but conditions were unfavorable to expansion of the business. Skilled workmen were scarce, and rags were more scarce. It was difficult to procure even the simple tools needed, such as vats, presses and moulds, and they were expensive. Domestic market for paper was irregular, and, altogether, the cost of production was relatively so high that a better quality of imported paper could be sold for no more than that of domestic make. The industry, such as it was, continued to be merely local, responsive to and meeting local demands almost entirely, principally those of printers like the Bradfords and others.

Considering now the first quarter of the eighteenth century, the printers of Boston outnumbered those of the rest of the country two to one. Four of the six American newspapers were published in Boston; two-thirds of the books and pamphlets of the period bore a Boston imprint. Eastern Massachusetts was easily the literary and typographic center. Yet, despite these facts, there was no paper mill in this locality until after 1728. Why Philadelphia should have established this industry, so far in advance of Boston, which would seem to have been in earlier need of it, is not

An Old Eighteenth and Nineteenth Century Watermark of the Joseph Willcox Ivy Mill

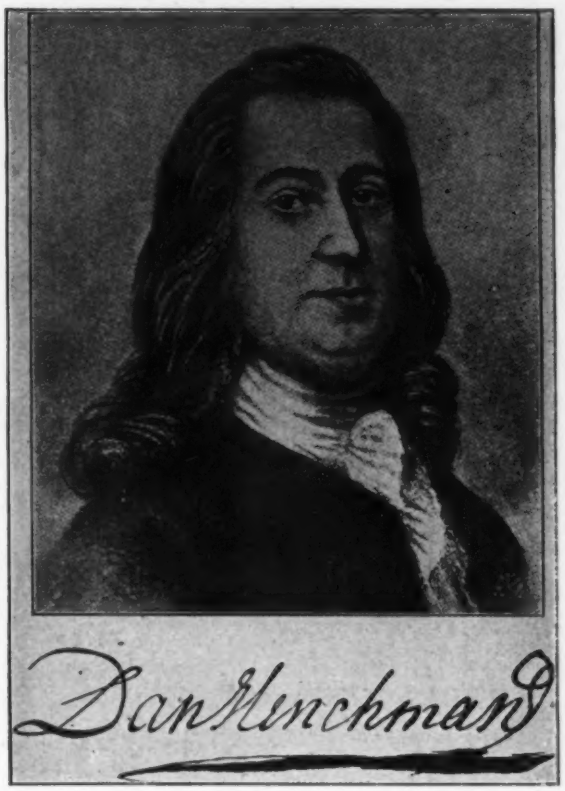
clear. Perhaps the commercial connection of Boston with England was so intimate and well developed that importation was not inadequate to the domestic needs. Whatever the reason, there were three mills in Pennsylvania and one in New Jersey before the first in New England.

Starting a paper mill in those days was a serious affair. Even though the contemplated mill might be ever so insignificantly small and unimportant, an ambitious man could not go out and invest his capital in site, water power, building, and proceed to work unrestrainedly. Paper making was regarded as a sort

One Shilling Land Lease to Build a 1726 Paper Mill

Most Print Shops Were in Boston—Far, Forsooth, From 1727 Paper Mills

of public utility—as indeed were other manufacturing industries—and it came under the watchful supervision of the Government commissions of that time, that is, the great and general court, or the assembly, or the governor and council, as the authority might be in different colonies. Permission to engage in the business was a perogative of the Government. A monopoly, for an indicated term of years, was asked for and generally included, if the permission was accorded at all. The grant was a ponderous, impressive document; elaborate with specifications and requirements. Such was the charter granted, upon petition, to several substantial citizens of Boston, in 1728, by the great and general court of the province of the Massachusetts Bay.



(From Oliver A. Roberts' "History of the Military Company of the Massachusetts")

One of the Chartered Proprietors of the First Paper Mill in Massachusetts, Dan Henchman, a Sturdy Citizen

(From an engraving after the famous Copley portrait in Memorial Hall, Harvard University, Cambridge, Massachusetts)

He Preceded "The Signature" — Thomas Hancock, Uncle of the More Famous John, Whose Top-Lined Chirography of the Declaration of Independence Is More Noted Than His Uncle's Place in History, as Part Proprietor of the First Paper Mill in the State, Then Colony, of Massachusetts

Ponderous Grant from General Court of Massachusetts Bay Colony to Build a Paper Mill in 1728

British Soldier Gets Furlough to Work in American Colonial Paper Mill in 1741

This company of paper-makers, who thus initiated the business in the Massachusetts colony, was a sort of family affair. Daniel Henchman, the senior promoter, was a rich man, a book-binder, publisher and bookseller of Boston, and Thomas Hancock was his son-in-law. Hancock was also a bookseller and a stationer, becoming one of Boston's wealthiest merchants. He was the uncle of the more famous John Hancock, of the revolutionary period. Benjamin Faneuil was the father of the celebrated Peter Faneuil. Gillam Phillips was a son-in-law of the elder Faneuil. Henry Dering, the last of these associates in the first Massachusetts paper mill enterprise, was the superintendent and agent.

More than twenty years before, a mill, with the raceway, had been built on the Milton side of the Neponset river, seven or eight miles from Boston. This was now leased by Henchman and his associates, who also erected a house for their workmen, the upper story of which was left as an open loft for drying the paper by exposure to the air. The business was slow in being fully started. From the beginning difficulty was experienced in securing capable workmen. Work was carried on only in a small and rather desultory way for several years. In 1731, Henchman exhibited to the great and general court in Boston a sample sheet of paper made there, but the mill was probably productive before that date.

Henchman first employed Henry Woodman, an Englishman, as foreman. After a few years of unsuccessful operation, Dering and Woodman retired. Jeremiah Smith was then engaged to take charge, and finally he became the sole owner, purchasing the leased mill and adjoining land in 1741. To assist, he procured Abijah Smith, an American paper-maker, and, as foreman, John Hazleton, an Engilshman. Hazleton was a soldier in one of the British regiments stationed in Boston, and a furlough was granted him to work in the mill, so much was the need of encouraging the manufacture of paper. Shortly, however, when his regiment was ordered to service in Canada, he rejoined the colors, and was among those who met death on the plains of Abraham. Smith continued in the mill until he was an old man. Associated with him in later years was his son-in-law, James Boies, and Richard Clarke, an experienced paper-maker from New York, who was said to have a superior knowledge of the business, and able to make his own molds.

In December, 1763, James Boies—or Boyce, as the name was often spelled—and Richard Clarke petitioned the great and general court of Massachusetts, reciting their work in making paper, and employing people "in picking up Raggs and Ropes of which the Paper is made", and asking "a Bounty for their encouragement of this Mystery." Upon this petition the legislative body took action as follows:

"And, as the Paper Mills upon the milton Atream have been very advantageous to the Province, but are now in a ruinous Condition; therefore, in order to their being repaired,

"Resolved That the Treasurer be directed to pay into the hands of the Petitioners the Sum of Four hundred pounds, taking their Obligation without Interest with Sufficient Security for the repayment thereof."

A second mill was built by Boies, and he was joined by Clarke, the two being partners in this enterprise for several years. The second mill was burned in 1768, but was promptly rebuilt. A third mill was owned in 1771 by Boies and Hugh McLean, his son-in-law. In 1773, George Clarke, son of Richard Clarke, added a fourth mill to this group, which had thus

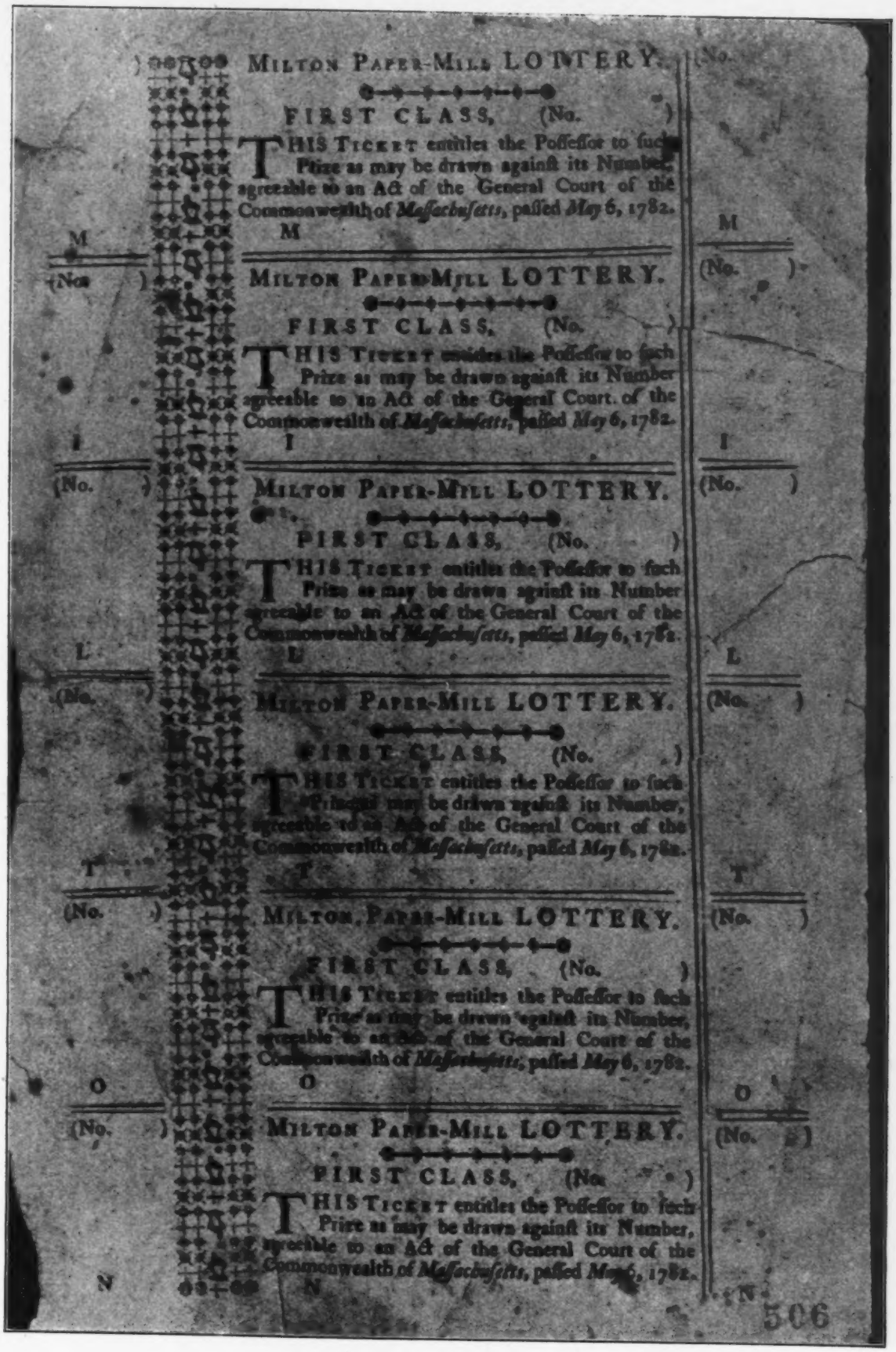
John Hancock's Uncle Thomas Was a 1728 Papermaker

(See Picture, Opposite Page)

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Lottery Tickets to Start Mill

A sheet of six lottery tickets, dated May 6, 1782, for the financing of a paper mill in Milton, Massachusetts, where the first paper mill in the State was established in 1728. It was not uncommon to raise money by lottery for the financing of various industries.



MILTON PAPER-MILL LOTTERY.

FIRST CLASS, (No.)

THIS TICKET entitles the Poſſeſſor to ſuch Prize as may be drawn againſt its Number, agreeable to an Act of the General Court of the Commonwealth of *Maſſachuſetts*, paſſed *May* 6, 1782.

M

MILTON PAPER-MILL LOTTERY.

FIRST CLASS, (No.)

THIS TICKET entitles the Poſſeſſor to ſuch Prize as may be drawn againſt its Number agreeable to an Act of the General Court of the Commonwealth of *Maſſachuſetts*, paſſed *May* 6, 1782.

I

MILTON PAPER-MILL LOTTERY.

FIRST CLASS, (No.)

THIS TICKET entitles the Poſſeſſor to ſuch Prize as may be drawn againſt its Number agreeable to an Act of the General Court of the Commonwealth of *Maſſachuſetts*, paſſed *May* 6, 1782.

L

MILTON PAPER-MILL LOTTERY.

FIRST CLASS, (No.)

THIS TICKET entitles the Poſſeſſor to ſuch Prize as may be drawn againſt its Number, agreeable to an Act of the General Court of the Commonwealth of *Maſſachuſetts*, paſſed *May* 6, 1782.

T

MILTON PAPER-MILL LOTTERY.

FIRST CLASS, (No.)

THIS TICKET entitles the Poſſeſſor to ſuch Prize as may be drawn againſt its Number, agreeable to an Act of the General Court of the Commonwealth of *Maſſachuſetts*, paſſed *May* 6, 1782.

O

MILTON PAPER-MILL LOTTERY.

FIRST CLASS, (No.)

THIS TICKET entitles the Poſſeſſor to ſuch Prize as may be drawn againſt its Number, agreeable to an Act of the General Court of the Commonwealth of *Maſſachuſetts*, paſſed *May* 6, 1782.

N

506

Underpaid Workmen Destroy Paper Mill

expanded in fifty years. The Boies & McLean mill was burned in 1782.

Others identified with the mill, before the end of the century, were Daniel Vose, who married a daughter of Jeremiah Smitn, and Jeremiah Smith Boies, son of James Boies. In 1795, Jeremiah Smith Boies erected another building for the purpose of making paper, chocolate and starch. He employed, as foreman, Mark Hollingsworth, from New Jersey, and that introduced, into this locality, the family of great paper-manufacturers of that name.

Soon after 1730, Samuel Waldo and Thomas Westbrook planned to build a mill in Falmouth, Maine, and Richard Fry, a paper-maker from England, was associated with them in the enterprise, possibly being the original promoter. Information regarding the affair is derived, chiefly, from papers in the court files of Suffolk County, Massachusetts. In 1739, Fry was confined in jail in Boston, on account of a debtor judgment of 70 pounds, sterling, obtained against him by Waldo and Westbrook in the superior court, sitting in York, Maine. From the jail he petitioned Governor Jonathan Belcher and the council and house of representatives of the province of Massachusetts Bay for relief.

Fry sought leave to bring a writ of review of his case to be tried in Suffolk County, and also to have a grant of land to recompense him for his expenses in leaving England, and for his work in the province. The council was not at all impressed by his claim, and his petition was dismissed. Although the petition says that the mills were "across the Presumpscot river," other papers in the Suffolk County court show that it was built on the banks of the Stroudwater river, a small stream near the Westbrook residence, Harrow House, in the outskirts of Falmouth, afterwards Portland, Maine.

Beyond the statement in the Fry petition, contradicted by court papers, as has been pointed out, no trace has been found of a mill on the Presumpscot. That on the Stroudwater was operated for some years. Workmen from England were employed, and, it is said, at one time they destroyed the machinery, being dissatisfied with the low wages paid them. Waldo and Westbrook could manufacture only by arrangement with Daniel Henchman and his associates, of Boston, whose charter gave them exclusive rights in Massachusetts Bay, of which province the Maine territory was then part. Their only market was Boston. The mill was finally burned, but remains of the dam and foundations of the building existed as late as 1875.

The fourth Pennsylvania mill, which followed the Rittenhouse by forty-six years, and the Wilcox by seven or more years, was, like others of its predecessors and contempories, principally a printer's mill. This was *Die Papier-Muhle der Bruderschaft zu Ephrata,* built at Ephrata, Lancaster County, on the banks of the Cocalico creek. Ephrata was a communistic and ascetic settlement of a branch of Pietists, of Germany, who came to Pennsylvania early in the eighteenth century. Members of the community lived in a kloster or convent, under monastic rules of celibacy and austerity. They set up several establishments, such as grist mills and saw mills. Soon the community became a great industrial center. A grist mill was built about 1736, and a paper mill soon after. At first, the Eckerling brothers were in charge of the mill. But, after they had been expelled from the community,

(From an engraving after a famous oil painting at Bowdoin College)

Samuel Waldo, Principal Proprietor of the First Paper Mill in Maine, Then a part of Massachusetts Bay Colony

because it was feared that they were becoming too materialistic and practical, the work was directed by Samuel and Jacob Funk, experienced papermakers.

Principal product of the mill was a coarse printing paper, and what was known as "macalatur," though some finer kinds of writing and printing were made. Ordinary grades of printing were made upon plain sieves, without water-mark, but other grades were water-marked. The wired sieves were a domestic product from Isaac Langle, of Germantown. It was claimed, at one time, that this mill was turning out more paper than any other similar establishment in the colonies. References in Chronicon Ephretense show that the mill was working as late as 1784.

Ephrata paper was variously water-marked. An early mark was a large design, rudely made, "adopted by the Zionistic brotherhood, and intended for the

Where the Zionist Brotherhood Lived and Worked, at Ephrata, Lancaster County, Pennsylvania (Paper Mill Is in the Lower Left Corner)

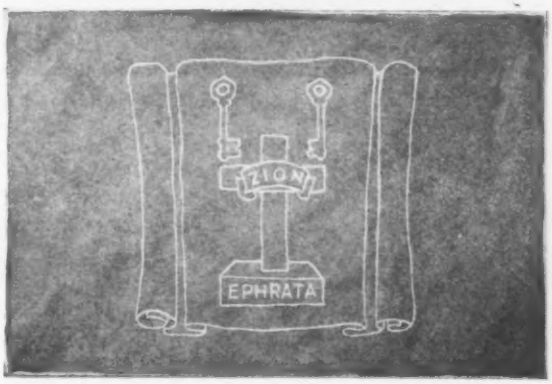
distinctly mystical publications" of Ephrata. Its conpicuous feature was a Latin cross, surmounted by a scroll, on which was graven the words "Zion." Extending from the top of the upright ends of the arm of the cross were two keys, these referring to *The Keyes of Solomon*, a mystical book of the seventeenth century, held in high esteem by the brotherhood. The foot of the cross rested upon a panel, upon which was the word "Ephrata" and the whole design was surrounded, as in a frame, by an ornamental scroll. This mark is seen on the paper of a book printed at Ephrata before 1745. After the Eckerling period, other marks were used, particularly indicating the management of the mill by the Funk brothers. One of these, on the fly leaf of a Saur Bible, was the figure 4—the mystical perfect number—and the initials R F—the private mark of the Funk family. Another mark on the paper, of some of the publications of the society, was F B, standing for Brother Funk. Then there was a post horn, in heart shape, with E F, standing for Ephrata, in the center; the letters E F on fine writing paper; and, sometimes, the full name Efrata, in letters nearly an inch tall.

Other early Philadelphia paper-makers, though more celebrated as printers, were Christopher Saur—Sower, in English—and Christopher, his son. Saur was a German, a university graduate, educated in medicine, and with business experience. He came to America in 1724, and settled in Germantown, where he was a

Second Bible Was Printed in America in 1743 from European Paper

farmer, and established various branches of manufacturing . He set up a printing press in 1738, and was one of the leading printers in the colonies. His paper mill, built in 1744, or before, was located on a branch of the Frankfort river, near the falls of the Schuylkill, not far from what is now Manayunk. Needs of his printing impelled him to try the papermaking business. He printed many books, the most famous of which was the German Bible, known by his name, the second bible printed in America, as is shown by the imprint "Germantown Printed by Christoph Saur 1743." Upon his death, in 1758, Saur bequeathed the mill, its appurtenances and other property, to his son, Christopher, who became one of the foremost Pennsylvania men of his day in wealth and in business activity and success. He had a large printing business, and "employed two or more mills in manufacturing paper."

It appears that Virginia had a paper-mill in 1714, the first in that colony. William Parks built it in Williamsburg, to feed his printing presses. Parks was the first editor and newspaper publisher in Virginia. He came from England, and established the Maryland Gazette at Annapolis in 1727, continuing there for eight years.



Ephrata's Crude Watermark in 1784 Was a Scroll of Zion's Cross and Keys

(Courtesy, Mary E. Perkins' "Old Houses of Ancient Town of Norwich, Connecticut")

Old Silhouette of Christopher Leffingwell

Connecticut had no paper mill until after the middle of the century. Christopher Leffingwell erected a mill upon the banks of the Yantic river, in Norwich, in 1776, and there made all kinds of paper, printing, writing, wrapping, cartridge, and sheathing. Quantity annually produced has been estimated at one thousand, three hundred reams, and the prices commanded varied from 4s to 6d to 45s per ream. Ten or twelve hands were employed. The mill was an object of great interest in the community. A private letter, written in October, 1767, said of it:

"The Paper-mill at Norwich is plentiful supplied with rags, and has full demand for its paper. Mr. Throop tells me that he had viewed it when at work; that it is a curiosity; that they mould and make ready for the Press about ten sheets per minute by the watch."

Although admittedly the mill was erected to meet a pressing economic necessity of the community, it was not financially successful in the beginning. Government aid was asked for and received, to keep it going as an undertaking of public importance.

Nearly fifty years elapsed, from the time when Bradford essayed to start the first mill in New York, before the first mill in that colony was eventually established. This was on Long Island, under the encouragement of another printer, Hugh Gaine, who was scarcely less distinguished in his calling than Bradford had been. It was built in Hempsted Bay about 1768, by Hendrick Onderdonk and Henry Remsen.

In the provincial convention of Maryland, May 25, 1776, James Dorsett came forward with a proposition to build a paper-mill. Dorsett was a member of the convention, and that body ordered that the treasurer of the western shore should "pay to Mr. James Dorsett 400 pounds like (common) money, to enable him to erect a paper mill.

An early attempt was made to begin paper-making in North Carolina. German Moravians, who originally settled in that Colony, established several industries there, before they moved to Pennsylvania. Among these was a paper mill, which was started in Salem, as early as 1766, according to some authorities. More than half a century later this mill was still in existence. This one mill was quite incapable of meeting public needs in that part of the country. As a matter of fact, there appears in some records the mention of a John Holgan, who is said to have built a paper mill near Hillsborough, Orange County, December, 1777.

The provincial congress of South Carolina, in a session in November, 1775, considered the subject of the encouragement of manufacturing in the colony, especially salt-petre, sulphur, bar-iron, steel, nail rods, gun locks, paper, lead and linens. Among other resolutions one was passed: "That a premium of five hundred Pounds currency be given to the person who shall first erect and establish a proper Paper Mill in this Colony, upon producing three reams of good writing paper, manufactured therat." Probably in response to this appeal, William Bellamy appeared before the congress, March 22, 1776, and presented a proposal for erecting a paper mill, which was accepted.

Paper making did not keep pace with paper use. Despite the starting of a few mills, the scarcity of paper was more and more decidedly felt in all parts of the country, from 1700 on. Public needs steadily increased, with the growth of population, and the resultant social, industrial and commercial expansion. This

increased need was quite in excess of the ability of the market, domestic or foreign, adequately to meet. Partly, this was owing to the financial insufficiency of the mass of the people, and, partly, to the difficulties attending the establishment of a new industry, where there was a dearth of the indispensible raw materials. Much, however, was fairly chargeable to the studied and persistent opposition of the mother country. Though, in this particular, the situation was not peculiar to paper. It prevailed in the case of nearly all manufactured necessities.

Notwithstanding all efforts to repress domestic industries, and to hold colonial trade at the command of the British manufacturers and shippers, importations were not easy nor voluminous, and most imported goods were costly. This was particularly true of paper. England, still behind in this branch of manufacturing, could in no wise supply the colonial market, which continued to be starved. Domestic mills, that had sprung up, were as yet so few in number, and so limited in capacity, that they were far from being able to make up the deficiency.

Then came the stamp act of 1765, and, in 1767, the Townshend measures, placing import duties upon glass, paper, pasteboard, lead, painters' colors, and tea. Ultimately, this legislation was beneficial, since it provoked the industrial and political revolt that led to independence. Non-importation and non-intercourse agreement of the colonists gave added impulse to native enterprise. But it was years before industrial stringency could be ended, in paper as in all else.

Many makeshifts were created in meeting difficulties that arose from this shortage of paper. Newspapers, particularly, were great sufferers, for they were the largest consumers. Evidence of the straits, into which they were forced, has been fully preserved in them. In some instances, the regular weekly issues were omitted, because there was no paper. Frequently, they

READY MONEY
For Clean LINEN RAGS,
May be had from H. GAINE.

AND for the further Encouragement of such poor Persons as are willing to employ themselves in procuring RAGS, the following PREMIUMS will be given.

To the Person that delivers the greatest Quantity of good clean dry Linen Rags to H. Gaine, in the Year 1765, not less than 1000 lb. TEN DOLLARS, besides being paid the full Value of the Rags.

To the Person that delivers the second greatest Quantity of Rags, of the same Kind, not less than 800 lb. in the Year 1765, EIGHT DOLLARS.

To the Person that delivers the third greatest Quantity of Rags, of the same Kind likewise, in the Year 1765, FIVE DOLLARS.

A Book will be kept to enter the Names of all such Persons, as bring Rags, and the Quantity they deliver; and the Premiums will be paid the first Day of the Year 1766, by H. GAINE.

"Ready Money for Linen Rags"—An Advertisement of the Hugh Gaine Mill in 1765

DAMAGED GOODS.

TO-MORROW,

An Peter Vergereau's Vendue-Store,

To be sold, at public Vendue,

By ISAAC MAN, and JOSEPH FORMAN,

WILLIAM GILLILAND,

JAMES MURRAY

A Fresh Assortment of the very best

TO BE SOLD,

For the Benefit of Mr. Hulet,

A Pair of young Bay Geldings,

To be sold, the House wherein John

Wherein Peter Gordon, of the City

By JOHN CHILD,

(From The New York Mercury, February 18, 1765)

How Pre-Revolutionary Newspapers Saved Paper

were printed upon paper of diverse sizes, colors and qualities, whatever the worried printer might be able to find. Often, curious typographical vagaries were compelled by the necessity of economizing. Printed matter was squeezed in, even on the margins, outside the usual width of the printed page, sometimes in narrower column measure than in the body of the paper.

With the outbreak of the war in 1775, the situation became even more serious. Calls for paper for official purposes, such as correspondence, military and legislative orders, documents and records, and for newspapers, broadsides, political papers, and sermons, increased tremendously. Importation was stopped completely. Home manufacture was greatly hindered, because practical paper-makers were hard to find. Either they had gone away with the British regiments, to which they belonged, or whose protection they sought, as tories, or they were patriots more or less eager to serve in the Continental army.

CHAPTER VI

And America Improved Paper After the Revolution

DURING the greater part of the first hundred years of its existence, American paper-making was indeed a feeble industry. Many things operated to its disadvantage, cramping its efficiency, curtailing the variety and amount of its production and retarding its development. For at least fifty years after Rittenhouse began in 1609, the mills were few in number, small and meagerly equipped; capable workmen were hard to find; machinery was of the simplest kind; methods were slow and crude.

A list of the items of personal property in a lease of Thomas Brown to Thomas Wilcox in 1732, conveying a half interest in the third Pennsylvania mill, sufficiently shows the scant equipment available at the time. It is particularly interesting when considered in comparison with what constitutes the outfit of even the smallest of modern mills.

"A mortice and (ha)mmers, a Vatt and Pott, two Stuff Tubbs, a Rag knife and Block, one press paper mould and a pair of Shop paper moulds, twenty-six fulling paper felts, Seventy-seven shop paper felts, two press paper Planks, a Press and Rag wheel, a screw and Box, a Glazeing Engine, two pairing knives, two little pails with iron hoops, one small ad, two pairing frames—one pairing Bench, three cocks, two troughs, one winch, a halfting bench, two tressels, a Iron Barr, six posts and Eighteen Rails for hanging of paper, one hundred polls for hanging paper, one pad, one pair of Stilliards, a Box for Paper Hanging stool, one hundred and sixty Tap pots, twenty cogs and three washers."

Later on, some of the mills were more pretentious establishments, though still infinitely far from the modern conception of what constitutes a proper plant. The principal improvement was in the introduction of the beating engine, which, of Holland origin about

For Nearly 150 Years Crane & Company Have Been in the Paper Business

Photograph shows a model of a one vat paper mill in 1801, the year the firm started in this industry. But the Crane family has been associated with Massachusetts paper production since 1776, when the Revolutionary War demand made paper so valuable. This model was made by Dr. Dard Hunter, of the Dard Hunter Paper Museum, Massachusetts Institute of Technology, for Crane Paper Making Museum at Dalton, Mass.

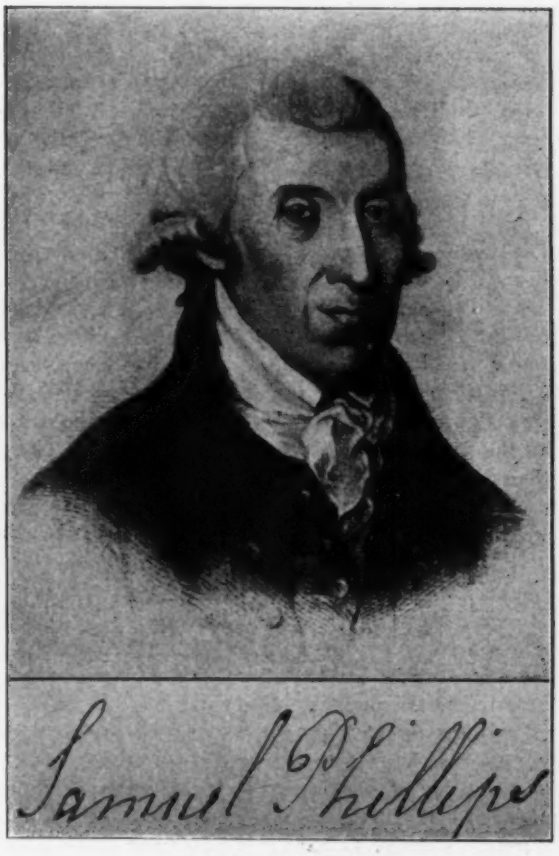
(Courtesy, Crane & Company, Dalton, Massachusetts)

1750, gradually came into use in the American colonies, to a modified extent. The first mill in central Massachusetts, built by Abijah Burbank in 1775, was considered one of the best in the country.

"It was a two-vat mill. A breast-wheel, twelve feet in diameter, furnished the power to drive the greatest portion of the machinery in the mill, which was composed of two engines, with rolls two feet in length and twenty-six inches in diameter, one duster and a grindstone, with which to sharpen the bed-plates to the engine. The rags were cut by hand on a scythe fixed in a post, or a long knife, and five men, with ten or twelve girls, made up the required quota of help. By running the two engines to their full capacity, the accustomed fifteen hours per day, they were able to turn out from two hundred and thirty to two hundred and fifty pounds of paper daily, or about one thousand five hundred pounds per week."

The equipment of a really first-class mill, toward the close of the eighteenth century, is shown in a description contained in the inventory of the mill erected in 1789, in Andover, Mass., as follows:

"A building occupied as a Paper Mill, 36 by 32 feet, with two vats upon the ground floor, which have a Cast Iron pot in each of them, sunk into Brick



(From a steel engraving in the "New England Historical and Genealogical Register")

Samuel Phillips, Owner of the First Colonial Mill at Andover, Massachusetts

(Courtesy, Crane & Company, Dalton, Massachusetts)

Ye Olde Tyme "Foolscap" Label of the Dalton, Massachusetts, Mill of Zenas Crane & Sons

chimneys, for heating the vats. The first floor has two engines for beating-stuff, a room for dressing rags, with a brick chimney and fire place, also two other rooms for rags. The second floor is occupied for a Rag ware-house."

"Another building, connected to the mill by a covered passage way of 20 feet long, used for drying and keeping paper before finished, 20 by 24 feet, at the end of the next room, 27 by 24 feet, in which is a cast iron stove, used in the winter season. At one side of the finishing-room is a sizing copper, set with bricks and brick chimney. Another building, 35 feet from the mill, that is 24 feet by 20, for Rags and finished paper. Another building, 131 feet from the mill, 20 by 13 feet, for Rope and other lumber."

First mill in western Pennsylvania, that of Jackson & Sharpless in 1796, was regarded as an extraordinarily imposing establishment, described by a local newspaper as "very capacious." Mill building was about seventy-five by forty feet, three stories high, and the entire plant, which included a blacksmith shop, machinery and workmen's houses, represented an investment of six thousand dollars.

A curious and exceedingly interesting chapter in this history of early paper-making in America is that which treats of the persistent and not always successful struggle for raw material to keep the mills going. Rags then constituted the essential fundamental for

the industry. Experiments had been made with other materials, but nothing had been discovered as an available substitute. And yet rags were not plentiful, and, for more than a hundred years, the existence of the industry was constantly imperiled by this scarcity. Population of the country was not large, and it was scattered. Clothing was not discarded until after careful and long-wearing, for the colonists were poor, and the climatic conditions bore severely upon them. In the absence of any incentive to saving, the rag-bag had not become a common adjunct to the household.

After paper-making began, a long and tedious process of education was necessary before the people generally could fully realize that this new use for old things, hitherto thrown away, rendered the habitual keeping of them worth while to families and of public advantage. In advertisements, that appealed to patriotism and pocketbook, newspapers implored this saving, and legislative bodies urged the common need in frequent resolutions.

Proprietors of a mill in North Carolina went beyond their northern contemporaries in the fervor of appeal for rags. Not content to rest alone upon the argument of patriotism and self-interest, they animated their plea with a flavor of delicate romance, showing that, to them, business had something more than a merely sordid, material side. Their advertisement read:

"By our unhappy Contest with Great Britain, and the Necessary Restrictions on our Trade, Paper has been an Article for which we, in this State, have much suffered, for though there are many Paper Mills in the Northern Colonies, where Paper is made in great Perfection, yet, by the Interruption of the Colony Trade by Water, the Southern Colonies have experienced a very great Scarcity of that necessary Article. To remedy this Evil, and throw in their Mite towards the Perfection of American Manufacturers, the Proprietors of a Paper Mill, just erected near Hillsborough, in Orange County, give Notice to the Public, that their Mill is now ready to work, and, if sufficient Quantity of Rags can be had, they will be able to supply the State with all Sorts of Paper. They, therefore, request the favour of the Public, and, more particularly, the Mistresses of Families, and the Ladies in general, whose more peculiar Province, it is, to have all their Rags and scraps of Linen of all sorts; old Thread Stockings, Thrums from their Linen Looms, and every kind of Linen is useful. As this undertaking is Novel, saving of Rags may, perhaps, be thought too trifling, and below the Notice of the good Matron of the State; but when they consider they are aiding and assisting in a necessary Manufacture, and when the young Ladies are assured, that by the sending to the Paper Mill an old Handkerchief, no longer fit to cover their snowy Breasts, there is a Possibility of its returning to them again in the more pleasing form of a Billet Doux from their Lovers, the Proprietors flatter themselves with great Success. Persons in the several Towns and Counties in the State will be appointed to receive Rags, for which a good Price will be given."

No Colonial Colored Supplement—But Newspapers Were Printed on Paper of All Colors, and Upon All Sizes, Due to Shortage of Paper

Primitive methods only were applied in the processes of the early mills. All the work was by hand. For preparing pulp there were big stone or iron vats or mortars; few mills had more than two vats, and many had only one. In these vats, filled with water, the rags were beaten to a pulp by heavy hammers, wielded by hand. From the vats the pulp was ladled into rectangular moulds, made with wire-cloth strainers and deckles. As the pulp flowed into these moulds, the thin sheets were interlayed with sheets of felting cloth. Heavy pressure was then brought to bear upon the mass, to squeeze out the water and, further, to flatten the sheets of pulp into sheets of paper. Then the sheets were taken out, one by one, and hung on poles to dry in sheds, or rooms open to free currents of air.

As far as possible, the white rags were set apart for the making of the better qualities of paper, but a general and careful sorting of these raw materials, so as to keep those of different colors and qualities entirely separate, was not always practicable. Accordingly, for a considerable part, all went into the vats together, and the natural result was a pulp of a dirty white or brownish color. No means were used to correct this color condition, either before or after the formation of the sheet, and no practical method of bleaching was known.

Purifying, or clearing the water used in the pulp process, does not seem to have been even considered necessary, and the water was clear and pure only as it might so come in its natural state, from its natural sources. A desire to have this water supply as clean as possible, existed, however, and mill sites were selected, not alone from considerations of water power, but, as well, where clean water could be assured. Few

Primitive Methods, Indeed, for Paper Production by Hand in Those Early American Days

streams were then contaminated, for defilement by sewage, chemical, and other refuse was not as yet known.

No method had been devised for producing a smooth surface, beyond what might come from heavy pressure. So the paper went into the market unbleached and uncalendered, and the peculiar dark—brown or gray—color, and sometimes mottled hue, seen in some of the books and newspapers of the period, is thus accounted for. Occasionally, artificial coloring matter, most frequently blue, was introduced into the pulp, and a bluish writing or printing paper produced. Newspapers, from time to time, printed on paper of this color. The pulp engine from Holland was introduced about 1750, but did not come to general use until long after that date. It was well into the next century before machinery of importance appeared.

In spite of all these drawbacks, improvements were made in the tools used, in the treatment of the raw materials, and in the methods of manufacture. While these improvements were not of too great importance, they did assist in developing the industry, and in improving the character of the product.

Paper prices, that prevailed during the early days of American paper-making, have been preserved in many merchants' accounts of those days. There is a statement of account between Andrew Bradford and Claus Rittenhouse, of Philadelphia, dated June 27, 1729. Rittenhouse is charged with various items, including seven hundred and ten pounds of rags, £4, 8s, 9d, and he is credited with paper sold from his mill to Bradford, as follows:

1729 June	27 By 36 lb press Papers at 9d	£ 2	2	0
July	3 By 1 Ream writing paper at 14. By 3½ Reams Printing paper at 7/6	2	0	3
	12 By 4½ Reams Brown paper at 4/6. By 2½ Reams printing paper at 7/6 By 45 lbs By 2 Reams of writing at 14/	4	19	9
	17 By 3 Reams Large printing paper at 10/	1	10	0
	22 By 1½ Reams printing Large at 7/6	0	10	9
August	14 By 11 Reams printing paper at 7/6	0	10	9
	23 By 14½ lb Fine press paper at 11d	4	2	6
September	6 By 7 Reams of Brown paper at 4/6	0	13	3
	20 By 5½ Reams of printing paper at 7/6	1	11	6
	22 By 30 lb press papers at 11d By 20 pound press papers at 10d...	3	8	0
	27 By 15 lb of press papers at By 3 lb Coarse at	1	10	5
October	18 By 16 lb Paist Board at By ½ Ream of writing paper	0	12	0
	25 By 86½ lb Bonet paper at 9d By a Ream of Brown	3	11	10½
November	17 By 3 Reams writing at 14 By 2 Reams Brown 4/6	2	6	6
December	3 By 42½ lb Paist Board at 7d By 2 Reams of Brown paper at 4/6 By 1 Ream printing..	2	4	6
	11 By 2 Reams Brown paper at 4/6	0	7	6
	20 By 3½ Reams Brown paper at 4/6 By 1			

Advertisements Asked People to Turn in Their Rags When the Revolution Caused Such a Shortage of Paper in 1776

	Ream writing paper..	1	9	0
January	17 By 5 Reams Brown paper at 4/6	1	2	6
	6 By 5 Reams Brown paper at 4/6 by 2½ Reams Printing paper at 7/6	2	1	3
1730 April	6 By 1½ Ream writing at 14	0	7	0
		£36	12	3

In Massachusetts, toward the end of the century, the mills had two vats and employed ten men, and as many boys and girls. Annual production was about seventy thousand reams of writing, printing, and wrapping paper. A two-vat mill required a capital of about $10,000, and its capacity of production was from two to three thousand reams of all kinds. Printing paper then commanded a price of from three to three and a half dollars per ream, and considerable had to be carried in reserve for customers.

The mill in Andover, according to the testimony of one of its owners, a year after it had started in 1791, was carrying stock "in paper of different qualities," to the value of "not less than a thousand more," and "credits to the amount of nearly two thousand." This was not a large business, even for that time. But, evidently, it was sufficiently complicated to give the owners some cause for worry.

In central Massachusetts, in 1777, the price paid for linen or cotton and linen rags was three pence per pound; in 1778, eight pence; in 1779, twelve pence, eighteen pence and two shillings; in 1780, three shillings and six shillings; and, in 1781, ten shillings. A rising market, to be sure.

The Troy, New York, mill, in 1792 and after, offered three pence per pound for clean, white rags, and two pence for blue, brown or checked rags. About the same time, the Pioneer Mill, in western Pennsylvania, was offering four cents per pound for white rags, and was selling all the paper that it could produce for one dollar per quire.

In 1787, Colonel Nicholas Long requisitioned the governor of North Carolina for supplies for his military camp, and submitted, in his estimate, that he should need "specie to purchase 20 Reams Writing Paper £120." In 1780, James Davis, the State printer, presented to the general assembly of North Carolina a memorial reciting the difficulties under which he labored, and the losses he sustained in printing for the State. Therein he referred to the "very extraordinary Rise in Paper, that Article now selling at Newborn from Eighty to one Hundred pounds per Ream." This was a war price, but, even at that, it seems bigger than it probably was in reality, for the pound was not the pound sterling, but the colonial pound, which, in federal currency, was about three dollars and thirty-three cents.

State Printer Complains to Assembly About Paper's High Cost in 1778

Wages were considered high, but, measured by present-day standards, they seem absurdly small. Thomas Houghton, of the mill in Andover, Massachusetts, wrote to his former home in England, in 1789, saying that he wished he had some English workmen with him, adding: "The wages is a great inducement; for good ones, used to writing paper in every stage, we would give fifteen shillings per week and board, or fifteen shillings per week, and an addition equal to board."

This indicates a weekly wage of about twenty shillings, equal to about five dollars, federal currency, at that time. Allowing for the difference in purchasing power of money, then and now, this can scarcely be regarded as a big wage. Trained labor in New England then commanded from three to four shillings per day.

Toward the close of the century, the industry had succeeded in making considerable advance, and was in a fair way to become a very important manufacture, in the number of mills at work, in the quantity and quality of production, and in ability more nearly to meet the growing domestic demand. It still labored under difficulties, and its shortcomings, especially as compared with its later attainments, may not be overlooked. But it had accomplished much in the economic life of the people, and had reached a point where it attracted national attention.

Few historians, even among those who have essayed particularly to review the economic and industrial development of the country, have gone far enough, or carefully enough, into examination of the records to appreciate the actual facts concerning the state of this industry at the beginning of our national existence. Undiscriminating observers seem to have been content to measure it by its more obvious deficiencies, and there let the case rest, without proceeding further. A popular American historian, writing of the period about 1784, has said:

"Paper was both scarce and expensive. Some few mills had recently been put up in Pennsylvania, but the machinery was crude, the workmen unskilled, the number of reams turned out, each month, by no means equal to the demand, and the quality of the paper not much better than that at present used for printing hand bills and posters. Bristol board seems not to

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Paper Label of the Old American Mill of R. & A. H. Hubbard, Norwich, Connecticut

nave been made in the country, and so little of it was brought in from abroad that the loss of it was severely felt."

The foregoing may be accepted as fairly expressing a common opinion among those who have not cared to investigate the matter fully. It is, however, far from being a complete, or accurate, presentment. Paper was scarce and expensive, it is true, but all considered, not relatively more so than other things at the close of the revolution. As usual, war had been destructive in this as in other manufacturing industries, and, in general, the paper mill condition reflected the condition of the country. Demand upon domestic productiveness had been abnormally augmented during the war, and, in the same way, raw materials and machinery had been less procurable. Thus, from both points, domestic productivity had not yet been able wholly to master the situation. But, steadily it was approaching that goal.

Manifestly absurd, to anyone who knows about the paper of that period, is the statement that "the quality of the paper (was) not much better than that at present used for printing hand bills and posters." Some of the paper certainly was not superior; in fact, none of it was equal to the best that is now made. But the worst was better than the worst of today, and there was little, indeed, that would suffer in comparison with the medium quality of the twentieth century. As has been already noted, rags were apt to be carelessly sorted, pulp was not bleached, machinery was not always efficient, and processes were far from perfect. That, however, the best paper was, in many respects, very good indeed, examination of newspapers, books, pamphlets, broadsides, and other prints, and of correspondence, account books, and so on, gives evidence.

Much was lacking in purity and regularity of color; this is more observable in the white, or natural color, paper than in the blue or brown; in texture and in strength it was generally admirable. Newspapers and books, printed in the middle of the eighteenth century and before, have endured, in well-nigh perfect condition, for one hundred and fifty years or more, despite much handling and lack of care. Is it supposable that as much will be said of the printed sheets after 1900 in another one hundred and fifty years? Anxiety of librarians and book-lovers, over the paper of the present generation should be sufficient answer to that. Compare a New York newspaper of 1750 with one of 1900, and note the superior enduring quality of the former. Plentiful testimony on this point has been offered. The two references following will suffice:

Horatio Gates Jones made an exhaustive study into the history of the Rittenhouse mill. In his report to the Historical Society of Pennsylvania, May 11, 1863, he dwelt upon the character of paper there produced, adding:

"A particular feature in the sketch, and in keeping with the subject, is the fact that the paper on which it is written was made at the first paper mill in America, by the first paper maker and his son, prior to the year 1699."

In his address, delivered at the celebration by the New York Historical Society, May 20, 1863, of the two hundredth birthday of William Bradford, John William Wallace, also refering to the Rittenhouse mills, said:

"From this mill came excellent paper as I can testify, to write or print on. What I read you is written on it. I hold you up a sheet of it."

Still it must not be assumed that all paper was of this good quality. Some of it was inferior, and especially so in a period long after the first years of the industry. Adulterations had become known and were practiced, though not in the mills. Some of the paper, early in the nineteenth century, was not as good as that of a hundred years before. It is said that once, in 1816, a set of Bibles crumbled to pieces two years after printing. For quiek perishability that paper was a fair rival of considerable that was made seventy or more years later.

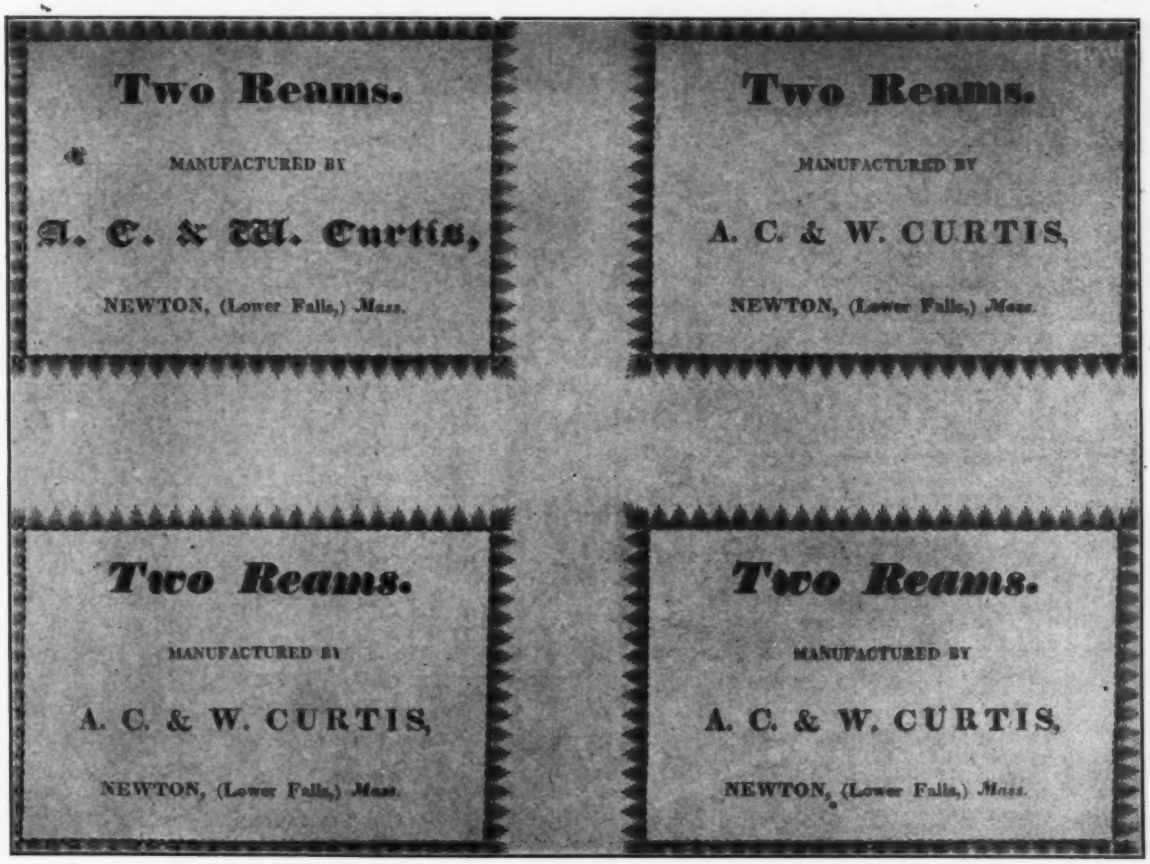
In this second phase of the paper industry in America, the development, perhaps, was slow. From the early days of the Revolution, in 1775, to the close of this period, near the end of the eighteenth century, the paper business had risen in America from one mill to many. They were small, and all of hand operation, of course. But they indicated the same, or similar, growth to that of the expanding country. From colonial development, with barely the necessities of life, the paper industry in America had now reached the stage of growth in tune with its new nation, the United States of America, instead of simply as the experimental years of the thirteen original colonies of his proud Britannic majesty, the king. So the chapters that follow, according to chronological order, are really the report of the modernizing paper trade in America, from hand work to the rapidly approaching machine, and to the technical age.

CHAPTER VII

An Infant Industry Gradually Becomes Larger

NOW, with the opening of a new century, the nineteenth, the paper industry in America indeed took upon itself new life. This was undoubtedly due to the connecting and incidental improvements abroad, the increasing demand at home. With the immediate possibilities of changing, almost at once, from hand to machine made production, the American paper business was far from ready for the change. Perhaps no industry is always prepared to change its methods, its capacities, even its personnel, over night. With the close of the Revolution, and the beginnings of an entirely new mode of life, of government, in America, the paper industry, such as it was, had to go along, and at once. No time could be lost in review. Rather, the preparations of the future were at hand; the future was the present. Rumblings of the changes, of the diversified improvements abroad, also started many men in the American paper industry thinking—and acting—along similar lines. If the French and the English were bringing out new machines, new techniques in production, then it was indeed time our American mills also took up the problems.

It would not be possible, nor, even if possible, would it be particularly interesting or profitable, to make a catalogue of all the mills of the first hundred years of American paper-making, especially those of later date than 1750 or 1760. They were sufficiently numerous, all things considered, except during the



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

One Hundred and Twenty-Seven Year Old Paper Labels of the Curtis Mill, Newton, Massachusetts, 1820, Presented to the Paper Museum by C. A. Wiswall, author of "100 Years of Papermaking on the Charles River," and Published in 1938

C. Gore, Also an Early Massachusetts Bay Colony Paper Mill Man

war, when, as we have seen, they were not capable ot supplying the deficiency caused by the interruption of trade with Europe. Broadly speaking, however, they were not strong establishments, either financially or mechanically. Most of them had only ephemeral existence, and little or nothing about them has been preserved in contemporaneous records. Their history, slight and unimportant at best, was long ago buried beneath the dead weeds of forgetfulness.

Evidence, regarding even the most important of the mills of the last quarter of the century, is fragmentary, and not wholly reliable. As near as can be ascertained, there were probably not above eighty or ninety mills in the country when the war ended. Soon, however, under the stimulus of increased demand and protecting tariff legislation, a few mills began to spring up slowly, particularly in the middle States.

De Warville, writing in 1787, said that he had been informed of sixty-three mills—forty-eight in Pennsylvania and fifteen in Delaware—their annual production being valued at $250,000. At the same time there were mills in Massachusetts, Connecticut, New York, North Carolina and elsewhere. Improvements, either in paper-making machinery or paper-making processes, were slow in coming. First United States patent law, for the protection of inventors, was passed in 1790, and a second law in 1793. During the ten years from 1790 to 1800, the number of patents granted was two hundred and seventy-six, of which only four related to the paper-making industry. One of the patents granted was to a John Biddis, of Pennsylvania, March 31, 1794, for making paper and pasteboard from sawdust. He built a mill for that purpose, and, around it, laid out and developed Milford, Pennsylvania.

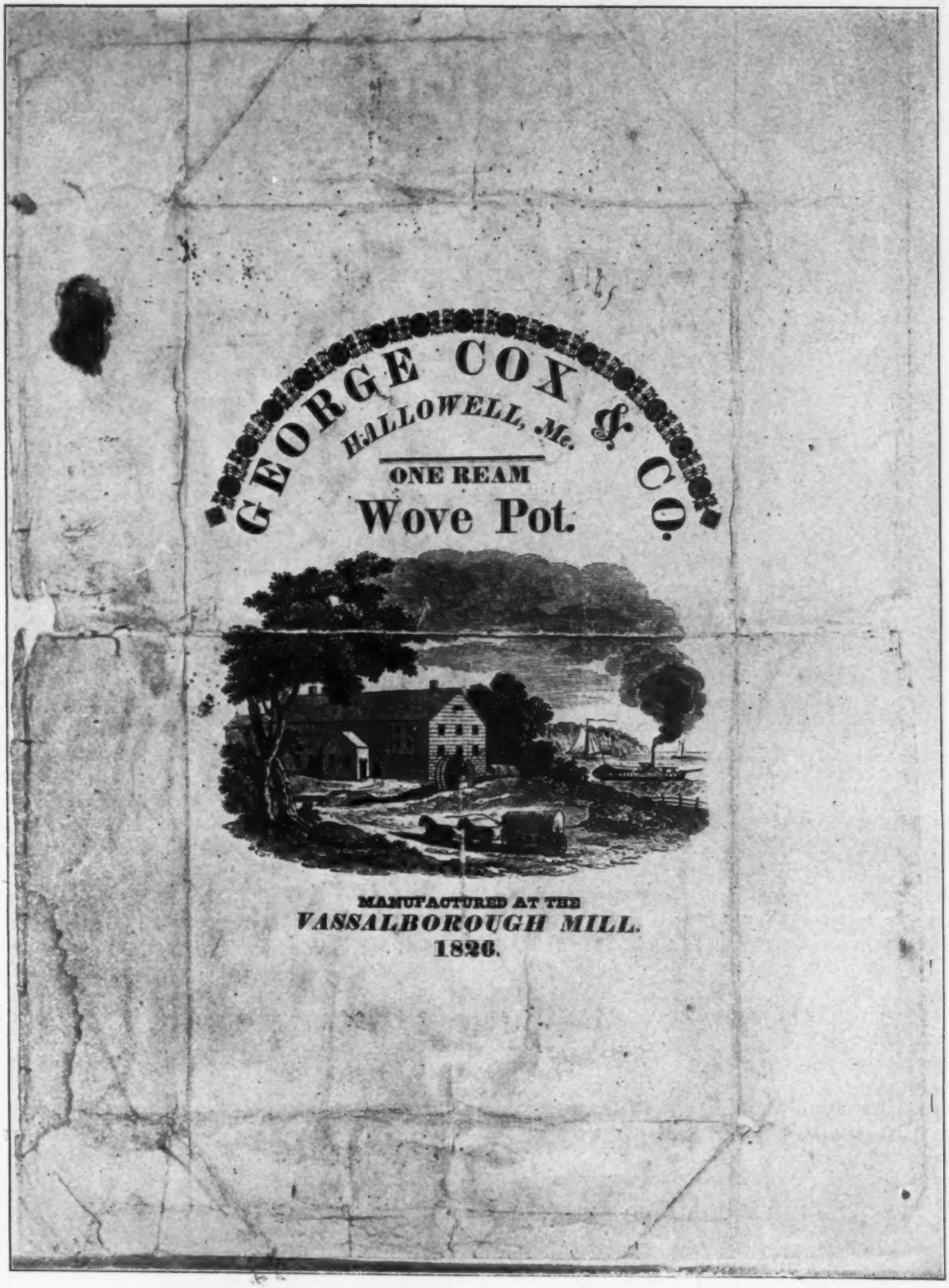
Paper-hangings, or wallpaper, came into the colonies as early as 1737, but in scant amount until well into the middle of the century. It was not used by pasting on the wall, as in later generations, but was suspended against the wall, or on wooden frames, as tapestries. Its use was frowned upon by the church as a sinful display of luxury and pride, and, as it was all imported from England and France, and was costly, those two reasons combined to prevent, for a long time, its general adoption. Finally, native manufacturers became interested, and, in 1763, and again in 1766, samples of the domestic product were exhibited.

Breaking out of the revolution stopped the advance of the industry. But, after the war had been brought to an end, manufacture was taken up again, and use rapidly increased. Much was still imported from England and France, and, in 1787, France, in order to further increase the demand, removed the export duty on what was bought by the United States. About the same time, mills for paper-hangings were running in Boston, Pennsylvania and New Jersey. In nine months they turned out ten thousand pieces.

By 1794 the Boston mills were producing twenty-four thousand pieces annually, for the demand of that part of the country. Within the first decade of the next century the mills in and near Philadelphia were producing 140,000 pieces annually, valued at $97,417, and, at the same time, mills of Providence, Rhode Island, were making eight thousand pieces. These early hangings were ordinary in appearance, but became quickly popular. They wer made from the coarsest and cheapest rags, and woolen stuff, in sheets, thirty inches long, pasted together. Patterns wer stamped upon them with wooden blocks by hand.

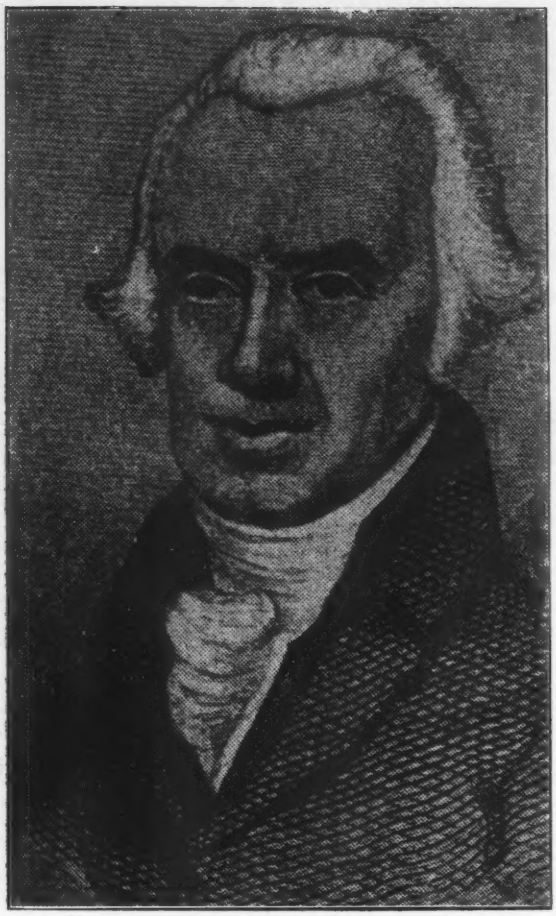
In 1786 the Society of Sciences of Philadelphia offered a premium for the discovery or invention of a process for protecting paper from the attacks of insects. Also a premium for the best method of making paper for the West Indies—particularly San Domingo—especially designed for resisting the attacks of insects peculiar to that region. Several plans were submitted, with samples, all proposing to use a sizing in which should be mixed ingredients fatal to insect life, but none was considered worthy of endorsement by the society.

It has already been narrated how, before and during the Revolution, Government encouragement, in various ways, was given to those who would engage in paper-making. With the beginning of national existence this policy was continued, only now it was not merely for the purpose of stimulating and developing the industry, but, also, for protecting it from foreign competition.



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Over 120 Year Old Label for One Ream of Wove Pot Paper
From the Hallowell, Maine, mill of George Cox & Company, 1826



Isaiah Thomas, Who Was Not Only a Paper Mill Proprietor, But, Also, a Printer, Publisher, and Editor

An early effort in this direction was made in 1785, when the legislature of Massachusetts imposed a duty on all foreign vellum and paper. But the people had not yet wholly overcome their repugnance to taxation, and the measure did not receive popular approval; accordingly it was repealed.

In 1789 a duty of seven and one-half per cent ad valorem was laid on blank books, writing, printing and wrapping paper, paper-hangings and pasteboard, and, at the same time, provision was made for the admission of rags free of duty. In 1792, the duty on paper-hangings was placed at fifteen per cent, and that on sheathing and cartridge paper at ten per cent, with five per cent more added to the duty on sheathing and cartridge in 1794.

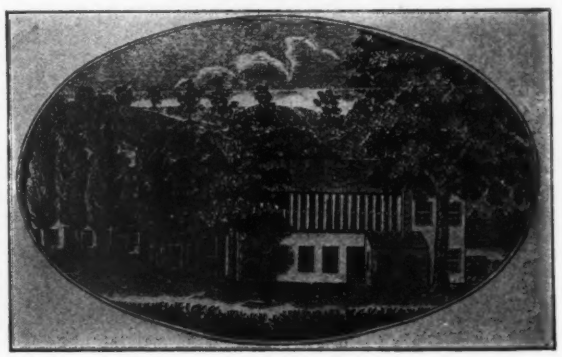
At the start of the nineteenth century there were probably a few more than one hundred paper mills in the country. Most of these, as their predecessors for a generation or more had been, were small affairs. Some of them were establishments of size and industrial importance, measured by the standards of that time, but still infantile in comparison with mills of today.

Gradually the number increased, until, by 1810 or thereabout, probably more than two hundred mills were in operation. These figures are obtained from the third federal census report, and from results secured, at about the same time, by a private investigator, supplemented by information from local histories.

A government census report, completed in 1813, included the following statement:

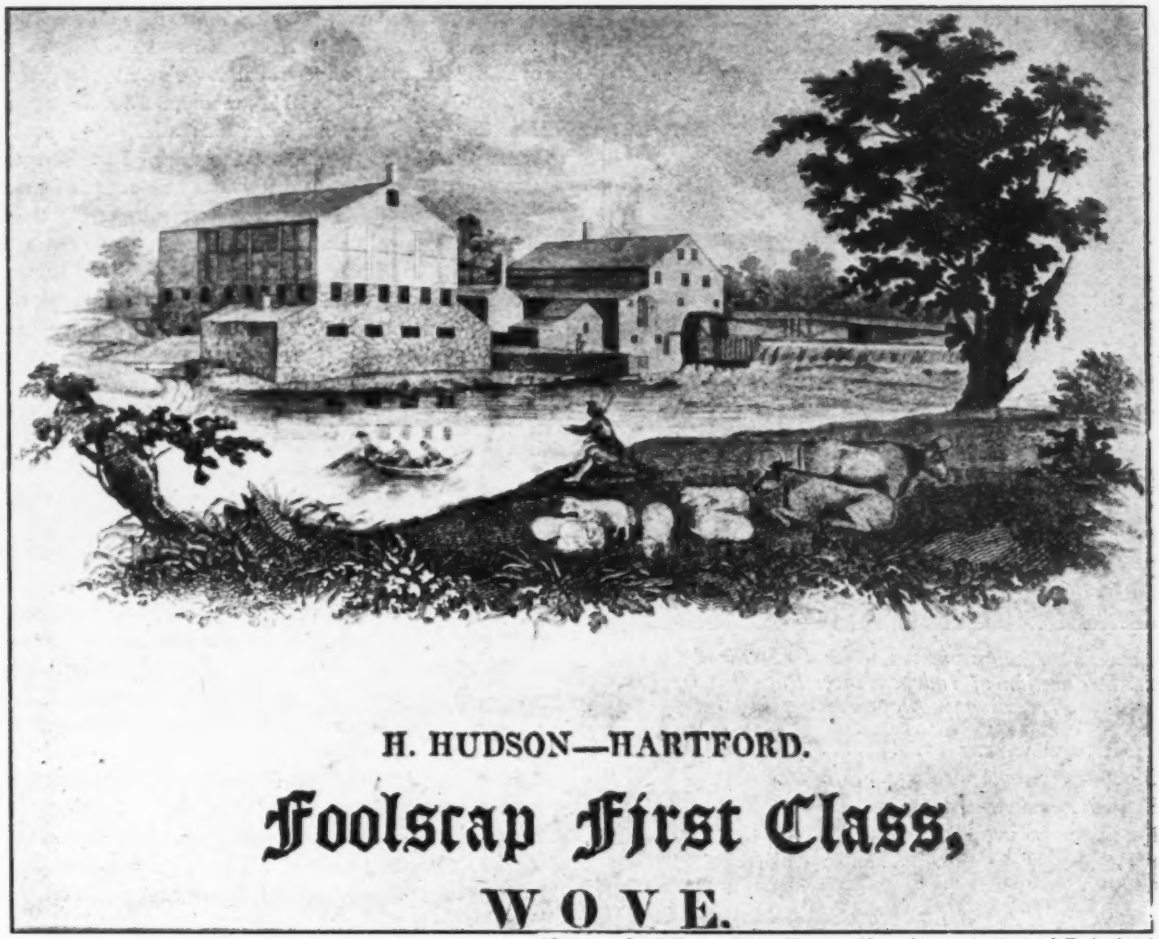
States, Territories and Districts	*Mills*	*Reams*	*Value of Product*
Maine	2	4,500	$16,000
Massachusetts	23	95,129	290,951
New Hampshire	6	...	42,450
Vermont	11	23,350	70,050
Rhode Island	3	14,625	53,297
Connecticut	19	...	82,188
New York	28	77,756	233,268
New Jersey	14	10,380	49,750
Pennsylvania	64	165,981	626,749
Delaware	4	...	75,000
Maryland	9	22,200	77,515
Virginia	4	3,000	22,400
Ohio	2	...	10,000
Kentucky	6	6,200	18,600
North Carolina	3	2,400	6,000
East Tennessee	2	...	15,500
South Carolina	1	...	...
District of Columbia	1	...	...
	202	425,521	$1,689,718

A memorial of the Society of Paper-Makers of the States of Pennsylvania and Delaware, of which Mark Willcox was president and Thomas Gilpin secretary, was presented to Congress in 1820, asking for further tariff protection. In this memorial it was stated that, in the district represented by the society, there had been erected seventy paper mills, which were in full operation until interfered with by importations after the war. These mills had ninety-five vats, which had cost to install about $500,000; they gave employment to nine hundred and fifty persons, half of them women and children, at a total amount of annual wages of $217,000; they consumed annually two thousand,



(From an old wood engraving)

At Worcester, Massachusetts, This Isaiah Thomas Paper Mill Was Established



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Old American Mill with Water Power

A finely-engraved ream label used by the paper mill of Henry Hudson, Hartford, Connecticut. This example dates from the 1812-20 period, and is representative of the finest labels of that time, used by American mills.

six hundred tons of rags, valued at $260,000, and produced about $800,000 worth of paper a year.

Owing to the depression in business, there were, in 1820, only seventeen vats working, paying an annual amount of wages of $45,000, having a production of $136,000 annually, thus leaving unemployed seven hundred and fifty-five persons, with a loss of two thousand, one hundred and twenty-eight tons of rags consumed, valued at $212,000, with loss of $624,000 in manufactured product. Memorialists asked that a duty of twenty-five cents per pound be imposed on all writing, printing, and copper-plate papers, and fifteen cents per pound on all others.

Until the new century was well under way, importations of paper continued to be heavy, despite all efforts to prevent it. Much of the writing paper of this period, as the correspondence that has been preserved gives evidence, bore the royal arms and other foreign water marks. Prior to 1820, the United States Senate used paper that was manufactured in Europe; some of it had the water-mark, "Napoleon, Empereur et Roi, 1813." This use of foreign paper continued, despite the offer of the Gilpin mills to furnish equally good paper at twenty-five per cent less cost. About, or soon after 1820, Simeon and Asa Butler, of Suffield, Connecticut, supplied to the national senate the first American-made paper used by that legislative body.

Prices for paper were then high, all things considered. One record of the prevailing prices has been preserved in a report presented to the national house of representatives, in January, 1821, by the committee on manufactures. Committee favored imposing higher tariff duties for the protection of manufacturers, and included in their report a statement of the kinds of paper then made in the United States, with ream weights and wholesale prices.

Kind of Paper	*Pounds Per Ream*	*Value Per Ream*
Quarto post	7	$ 4.00
Folio post	16	9.00
Stout demy writing	22	10.00
Stout medium writing	28	22.00

Robert R. Livingston, Who Not Only Firmly Signed the Declaration of Independence, But Also Improved Processing in Papermaking in 1799

Stout royal writing		34	16.00
Stout super-royal writing		40	18.00
Stout imperial writing		45	20.00
Foolscap writing	No. 1.....	15	4.00
" "	No. 2.....	13	3.50
" "	No. 3.....	12	3.00
Demy "	No. 1.....	16	5.00
" "	No. 2.....	16	4.50
" "	No. 3.....	16	4.00
" "	No. 4.....	16	3.25
" "	No. 5.....	16	2.75
Medium "	No. 1.....	18	6.00
" "	No. 2.....	18	5.00
Royal "	No. 1.....	20	7.00
" "	No. 2.....	20	6.00
Super-royal "	No. 4.....	22	4.50
" " "	No. 5.....	22	4.00
Imperial "	No. 4.....	25	4.75
" "	No. 5.....	25	4.25

Fuller's press papers were generally sold at twenty cents per pound. Sheathing paper and paper used by sugar refiners sold for about eight cents per pound. Common wrapping paper, sold by the ream, was graded in different sizes, as cap, pot, crown, demy, royal, super-royal, and so on, and sold at from six to eight cents per pound. Tissue paper, used mostly for protecting copper-plate engravings in books, was commonly made on medium-sized moulds, weighed about six pounds per ream, and was worth about six dollars per ream, commanding high price on account of being made, in part, out of new stuff. Super-royal printing was seldom finer than No. 4.

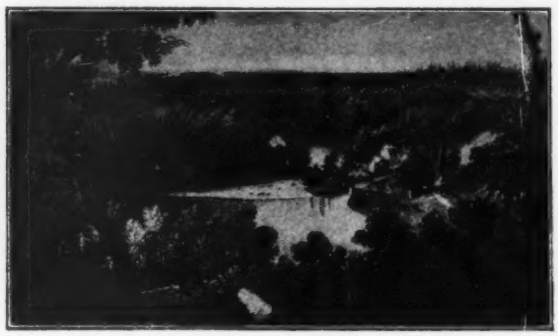
Standard sizes of moulds, used in the manufacture of hand-made paper, were: Foolscap, 14¼ x 16¾ inches; littrice, 15¼ x 16¾; demy, 16 x 21; extra royal, 21½ x 25½; super royal, 20¼ x 27½; imperial, 22½ x 30½; post, 17 x 21½; medium, 18 x 23; royal, 21 x 24; manslaughter, 22 x 32; atlas, 26½ x 33. Bank paper was made of foolscap. Papers were assorted into four grades, styled in the order of their perfection: whole, first retree, second retree, third retree or broken. Each ream consisted of eighteen quires of its particular grade, and two quires of broken sheets, one on the top, and one on the bottom, of the ream. Newspapers were often printed on paper of the second or third quality.

Advanced fully into the second century of its existence, American paper-making had finally established itself in a fixed position among the foremost manual activities of the new nation. In the census-taking of 1810, it was one of the twenty-three industries specifically included, and only ten stood ahead of it in the value of its manufactured product.

From this point on the record is one of development in widely separated parts of the country, of the opening of new paper-manufacturing centers, of the introduction of machinery, and of improvements in methods. This ripening growth covered the better part of the first half of the century, before the industry began to show that it was soundly on the way to being fully rounded out, and substantially established in its modern conditions.

John Roberts was one of the first American manufacturers to introduce the Fourdrinier machine, and he added improvements in machinery and new methods of his own devising. Among his inventions was a machine for tarring sheathing-paper, used for building purposes, and the Roberts mill soon became widely known for its high grade of standard tarred paper. At one time, the mill was almost exclusively occupied with this product. Beginning with coarse wrapping paper, Roberts was shortly one of the first manufacturers in the country to make fine grade hardware papers. In 1916, the mill was making asbestos paper, a logical advancement from the original tarred roofing paper.

Until after the first quarter of this century had



(From an old wood engraving by John Sartain)

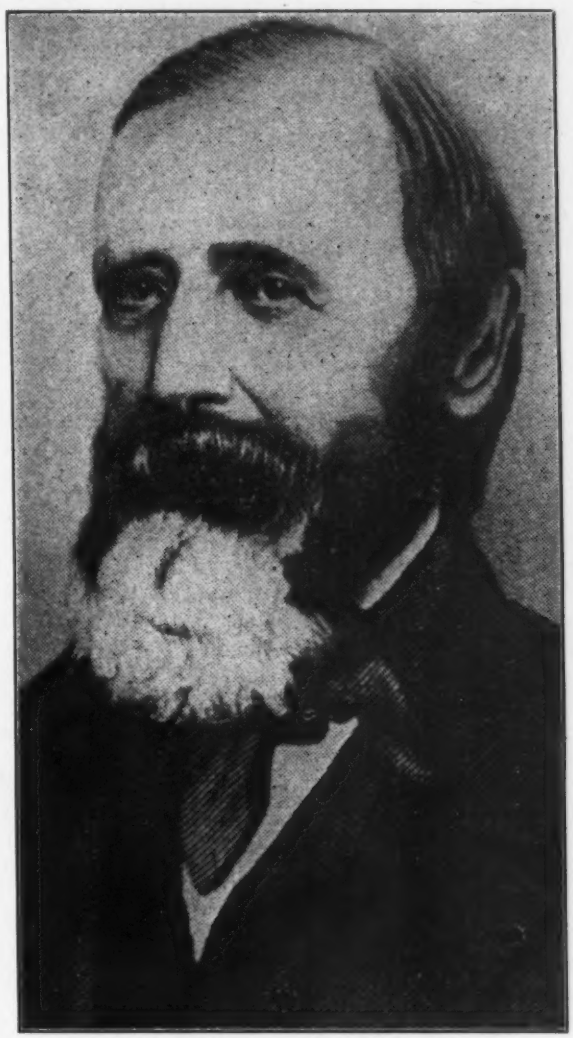
Famous Gilpin Mill on the Equally Famous Brandywine River, in Pennsylvania

nearly passed, machinery, as the word is understood in modern times, was unknown. Waterwheels and beating engines were part of the equipment of every mill, but that was the end of the labor saving devices. All else was primitive hand-work, such as had prevailed along through generations of paper-making. Some mills still remained in the one-vat class, but most of them had at least two vats, while not a few could boast of three, or even four, vats.

An average two-, three- or four-vat mill represented an investment of from $3,000 to $8,000, the lesser figure more generally than the larger. It was the rare exception when a mill could be considered to be worth $10,000. Reports of the burning of mills, from time to time, mostly put the values at $3,000 to $6,000, but a mill on the Bronx river, in the suburbs of New York City, owned by David Lydig, was insured for $32,000, when it was destroyed by fire in 1822. This was considered a costly establishment, being well equipped, and carrying a large quantity of paper stock. Mill of the Gilpin brothers, on the Brandywine river, and several of those of the Ames family, in and about Springfield, Massachusetts, were also valued at high figures, the Gilpin at from $350,000 to $500,000, and the entire Ames plant at fully as great an amount, if not more.

To man a one-vat wrapping paper mill required four men and a boy; twenty posts was a day's work, requiring about nine hours' labor for two men and a boy at the vat; one hundred and twenty-six felts, or one hundred and twenty-five sheets, constituted a post, so that two thousand, five hundred sheets were turned out daily. A good two-vat mill could be depended upon to produce two thousand to three thousand reams of all kinds of paper annually, with twelve more workers—men, women, boys and girls.

In the collecting of rags and other raw material, and in the making of the paper, two thousand, five hundred persons found employment. A four-vat mill could turn out, every day, about four hundred pounds of hand made paper at forty to fifty cents per pound.



Looks Like Gen'l Garfield, But Really Is John Roberts, Owner of One of the Original Mills at Waltham, Massachusetts

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

1827 Paper Label

A ream label from the renowned Goodwin & Company mill, Hartford, Connecticut. The label dates from 1827.

Most of the small mills were, at first, run by the owners with the help employed from the neighborhood. Gradually, as the industry expanded, and the demands upon the mills for paper increased, a class of professional paper-makers sprang up, and the mill proprietors came more and more into dependence upon them. They were a wandering lot of vagrants, very much like the old-time tramp printers. In fact, many of them were veritable tramps, travelling about the country, from mill to mill, as they might wish to have employment.

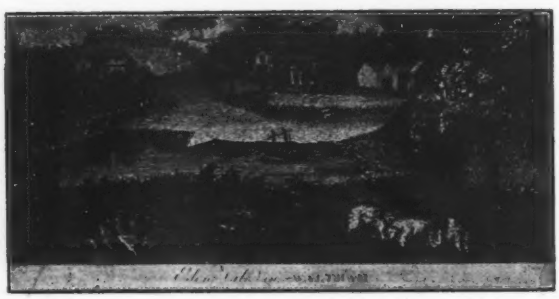
It was a great accomplishment to be a good vat-man, one who could hold the mold with its fibre and water level, and thus make a perfect sheet of paper, of uniform thickness. Men began work in the mills early in the morning, stopping for breakfast, and particularly, taking a rest at grog time, about eleven o'clock in the forenoon. A day's work of twenty posts was

generally finished early in the afternoon, and then resort was had to the village tavern for the rest of the day. These professional paper-makers could be distinguished from other workmen by their big, red hands, the result of dipping their hands continually into the warm water and pulp, and by their stooping, round shoulders, caused by constantly bending over the vat.

Until well into the nineteenth century, as previously stated, original hand processes in paper making had not been much improved upon. Only a very few small mechanical devices had, from time to time, been introduced into the mills, mildly to increase their efficiency. But the vat men continued to dip the pulp into the moulds, shake out the water until the sheet was formed, and the sheets continued to be hung separately on rods in the lofts to dry. The mill of 1800, save in the substitution of the beating engine for the fermentation or the stamping methods of reducing rags to pulp, was not materially different from that of 1700. More than one hundred years had elapsed since the first mill had been built in Pennsylvania, but the American industry was still in an infantile stage, as far as any appreciable attempt had been made to introduce machinery or new methods.

In the beginning of paper making, from pulp, the rags were introduced by washing them in water, and then setting the mass to ferment for many days in close vessels, until the desired pasty state of comminution had been attained. An advance upon this crude method came in the introduction of stamping rods, to beat the rags into pulp. These rods, incased with iron at one end, were operated in oaken mortars. To some extent, at first, they were worked by hand, but, most generally, they were moved by water-wheel machinery. Even this method of getting pulp was tedious and unsatisfactory enough. Sometimes, forty pairs of stamps would be required to work steadily twenty-four hours, in order to prepare a hundred pounds of rags.

Then came the beating engine, or Hollander, so called from the supposed country of its origin. Most authorities on this subject have placed this machine, first, about the middle of the eighteenth century. Some even have given 1760 as the precise year of its appearance, and that date has been generally accepted. Doubts exist concerning this, however, and it must be



(From The Massachusetts Magazine, 1793, as engraved at the time.)

Eden Dale Mill, First in Waltham, Massachusetts

One of the First Paper Mill Men in Central Massachusetts, Major-General Caleb Burbank

conceded that good reasons have been adduced to show that the machine, or, at least, something analogous to it, was in use a half century before that time. The case has been concisely stated by an English writer:

"Unfortunately, the date of the invention of this important machine has not been definitely traced. Earliest mention of it seems to occur in Sturm's *Vollstandige Muhlen Baukunst*, published in 1718. It was in extensive use in Saardam in 1697, so that the invention is at least some years previous to 1690."

But by whomsoever invented or wheresoever first used, the machine, as it was finally developed in Holland, was for a process of macerating rags into pulp for paper-making by means of a revolving cylinder, armed with metal blades, which rotated in close proximity to a stationary plate, composed of similar blades. Between these blades the stock was drawn by the motion of the roll, and subjected to continuous beating until it was reduced to pulp consistency. The Hollander has been in uninterrupted use to the present day, although the modern machine represents a great advance over its prototype. During the hundred and fifty or more years that have elapsed since it was devised, it has been greatly changed, enlarged and improved, and others, patterned after it, have arisen. But the fundamental principle of the original still remains in the modern beating engines, which are essential instruments in all paper-making.

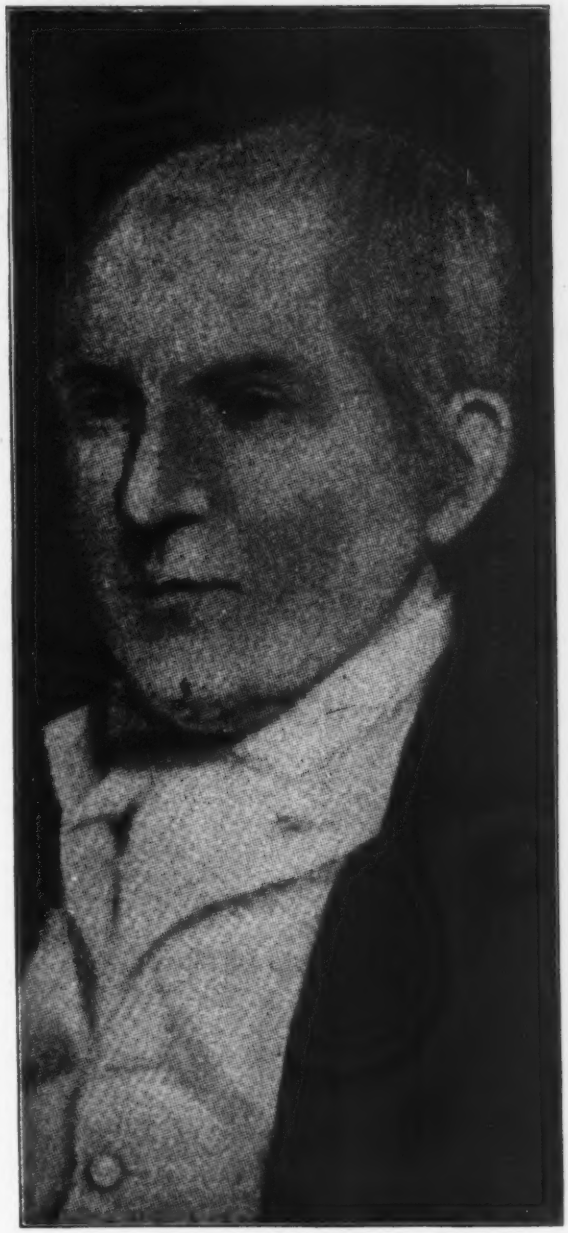
In Holland, the first engines were small, and were driven by wind mills, the principal source of power in that country. The new machine was slow in being accepted elsewhere, but it soon superseded the old process in Holland. It is said that, in 1770, there were eleven large mills in Holland, where the engines driven by wind mills accomplished more in an hour than the mills in Germany, where water power was used with stampers, could perform in six hours.

In the United States the Hollanders were run by water-power first, and, long afterward, by steam power. Their introduction made the first decided change in the methods that the mills had known, increasing their power of production, and improving the quality of the paper that was made, enabling the industry to go on to a wider development than it had before known. Supplementing the beating engine came the Jordan, an American invention, which takes the pulpy mass from the stuff-chest, and further cleanses and refines it, making it of uniform consistency before it is finally delivered to the paper-machine.

In the early years of the century, a few men, of a mechanical turn of mind in Europe and the United States, were giving more thought to the possibility of devising some method of making paper by machinery. In other industries machinery had been introduced with promising results, and the advantages that should accrue from its adoption in paper manufacturing could be safely predicted. For half a century, the Hollander had been gradually coming into extended use, and with this, pulp could now be produced in larger quantity than it could be utilized in ordinary equipped mills, with the vat men working only by hand. A faster method of transforming the pulp into paper was an economic necessity. Machines were needed to supplement the Hollander, and, naturally, they came, the Fourdrinier first.

The Fourdrinier was invented by Nicholas-Louis Robert, who, while managing a large paper mill in Essones, owned by St. Leger Didot, of the famous French family of publishers, conceived the idea of making paper in a continuous sheet. After several years' experimenting, he produced a machine which consisted of an endless wire band, passing between two squeezing rolls, and this was the primitive beginning of what was developed into one of the most marvelous of modern machines.

Robert obtained a patent in 1799. He had been assisted by his employer, Didot, to whom the patent for the new machine was now transferred. John Gamble, a brother-in-law of Didot, became interested, and, going to England, took out patents there. Didot and Gamble entered into arrangements with Henry and Sealey Fourdrinier, wholesale stationers, who financed the invention in England. With them, Bryan Donkin, a practical mechanic and machinist, was associated, and he made improvements on the original, a new machine being patented in 1807 by the Fourdriniers and John Gamble, and first made in 1808. In



Nathan Sellers, Who Made Many Paper Moulds in Pennsylvania in the American Revolutionary Period, So Continental Soldiers Would Have Paper for Their Necessary Cartridges

principle it was the Robert machine, but, already, it was far in advance of that.

The Fourdrinier brothers spent over 60,000 pounds experimenting and improving the machine, and, in consequence thereof, were forced into bankruptcy. With them Robert, Didot, and Gamble were ruined. In 1840, a grant of 7,000 pounds was made to the Fourdriniers, and that, with the distinction of having the machinery forever known by their name, was all that ever came to them for their labors and expenditures. Robert had previously received from the French government a bounty of eight thousand francs, and

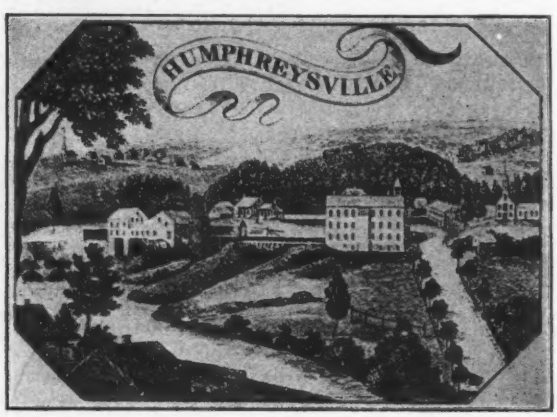
that was the sum total of his profits from his ingenuity. Bryan Donkin was the only one of the group who profited financially. Devoting himself to the manufacture of the machine, he did well, and eventually was successful in establishing a large business out of it.

In point of date the Fourdrinier, in France and in England, was the first really great invention that paper-manufacturing had known. So great, indeed, was it that, not only did it practically revolutionize paper-making the world over, in the course of time, but it became firmly fixed as the one fundamental factor of the industry in its modern existence, elevating it into the front rank of mechanical pursuits.

Meantime, however, others had been working along somewhat similar lines toward the same end that Robert had reached. John Dickinson, of England, succeeded in 1809. He invented and patented a cylinder covered with a wire cloth, the cylinder to revolve in a vat filled with pulp which, by a system of suction, was made to adhere to the cloth until the paper sheet was formed, when it passed on to another cylinder covered with felting. Whether the Dickinson invention was early known in the United States cannot be said. But the first American paper-making machine may have been suggested by it, or may have been worked out independently.

At any rate, it was nearly twenty years after the invention of the Fourdrinier in France, and seven years after the appearance of Dickinson's cylinder machine in England, before the American machine can be said to have really appeared. At that time nothing was known here about the Fourdrinier or the cylinder in any practical way. Both had been slow in adoption, even in England, and, as for the United States, they had not been discovered, or, at least, remained in the theoretical stage.

In December, 1816, Thomas Gilpin took out a patent on his cylinder machine, and, in August of the following year, he put the machine into actual use in his mill, running off, for the first time, on this side of the Atlantic, machine made paper. The invention



(Courtesy, Campbell, Sharpe & Bassett's "Seymour, Past and Present")

Mill Label of the Humphreysville Plant, from a Wood Engraving

General David Humphrey, Not Only a Paper Mill Man, But Soldier, Diplomat, and Even a Poet

showed increase of speed and power, as well as economy in cost of producing. The Gilpin machine was more simple, and, as was ultimately demonstrated, less efficient than the Fourdrinier. But it demonstrated the wide possibility of a very great advance in the manufacturing of paper. It was merely a revolving cylinder, making paper continuous and endless in length, in place of single sheets. In no respect was it an advance upon, even if it was equal to the Dickinson, of England. But its introduction into the mills of the United States anticipated all the foreign machines by a few years, at least, and gave the first decided impulse in this country to the making of paper by machinery. It was five or six years later before any paper was made from a Fourdrinier in this country.

The Gilpins made every effort to keep their machine a secret, but it was impossible to hide it altogether and permanently. The more the success of the machine was demonstrated, the more jealousy and envy was excited among other manufacturers. That this new paper machine would seriously and permanently affect business throughout the country was perfectly obvious, and all means, fair and unfair, were taken to procure knowledge of it. Eventually, by obtaining scraps of information from some of the Gilpin workers, and by careful study of the patent, sufficient ideas were obtained to render evasions of the patent possible.

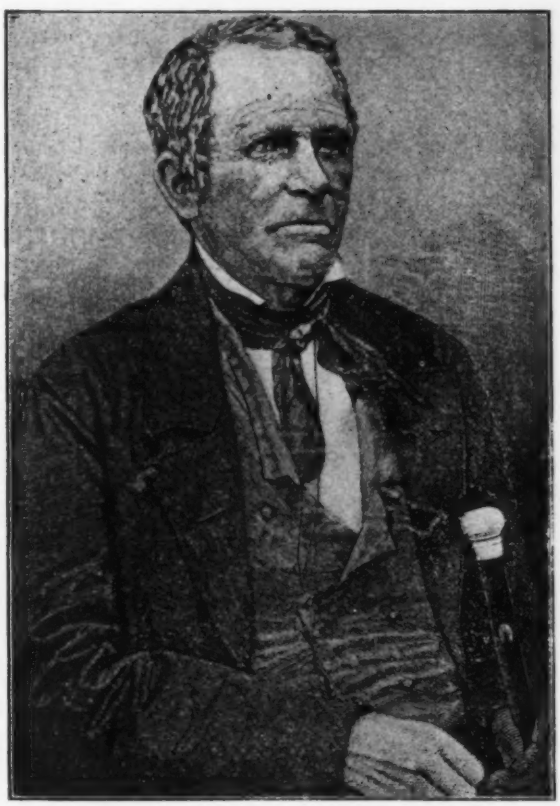
Experiments were made by other proprietors of mills, and they were soon able to profit by the new idea. Several new and improved cylinders were brought out before 1830. Eventually, the cylinders were generally introduced into mills everywhere, and the prestige of the invention, and the credit of having begun the making of paper by machinery in the United

States, have never been fully accorded to Thomas Gilpin.

It has never been conclusively determined where and when the first Fourdrinier was located in the United States. The best evidence, however, seems to indicate that the machine was imported in 1827 by Henry Barclay, of Saugerties, New York, and was there started running by Peter Adams, who afterward founded the Peter Adams Company, in Buckland, Connecticut, and the Adams & Bishop Company, in Newburgh, New York. The machine was built by Donkin, of London, and was sixty inches in width. The senior member of this firm of paper manufacturers was Moses Y. Beach, afterward owner and publisher of the New York Sun.

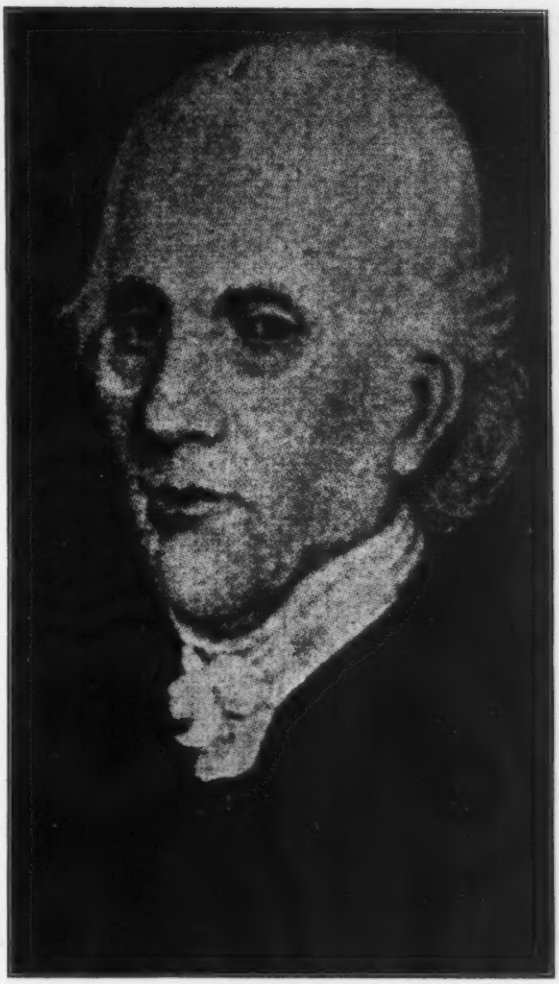
The first Fourdrinier made in the United States was by the Smith & Winchester Manufacturing Company in their shops in South Windham, Connecticut, in 1829. It was set up in the mill of Amos H. Hubbard, in later time The A. H. Hubbard Company, Norwich, Connecticut, in May of that year.

The first felts produced in the United States for paper machines were made in 1864. Prior to that time all endless felts had been imported from Europe, notwithstanding the fact that cylinder and Fourdrinier machines had been slowly increasing in number here for nearly fifty years.



(Courtesy, The Hawley Record)

An Early Paper Mill Proprietor of New York, Seth Hawley



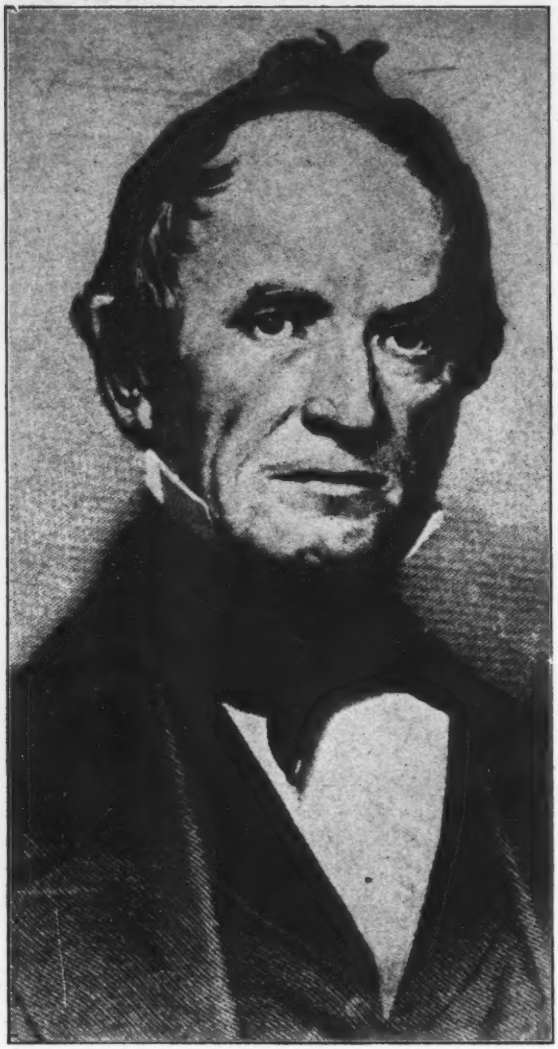
(From an old engraving in O'Reilly's "Sketches of Rochester")

Nathaniel Rochester, for Whom the City of Rochester, New York, Is Named, and Who Was the Very First Paper Mill Owner in Western New York State

Fourdrinier wires continued to be imported from England for twenty years after the first Fourdrinier machine was set up in the United States. In 1847, William Staniar, who had served his apprenticeship in one of the largest wire cloth weaving establishments in Manchester, England, came to this country for the express purpose of starting the manufacture here. It was a difficult task introducing American wires.

In the paper mills the machines were generally run by English and Scotch tenders, who were continually opposed to most things American. Also, there were trade customs to be overcome, and importers tried in every way to keep out the home made wires. In the end, however, these wires succeeded, in spite of all opposition, and the time soon came when they were recognized as being superior to anything of the kind that was made in Europe.

After the invention and improvement of the cylinder, further changes and improvements in paper making



Seth Bemis, Proprietor of a Foremost Massachusetts Mill in the Early Days of the Bay State Industry

followed. At first, the revolving mould or cylinder was turned by hand in the vat, and the wet web of paper was taken off by and endless felt running between rollers that pressed the water out, leaving the paper sufficiently strong or dry, to be wound upon a drum.

When a thickness of four or five inches had accumulated on the drum, this was cut by a large knife or saw blade, and then divided into packs of sheets of the desired size. Sheets were taken to the loft and air-dried, as those that were hand made. Felt used with the machine was continually getting filled with the soft pulp, so that much paper was spoiled. At the end of a few hours' run, the felt had to be removed and washed, which made trouble, and occasioned loss of time.

Altogether, the process was still slow, and far from satisfactory, although in results better than anything before known. An experiment in sprinkling the felt with water, to keep it a little more clean, led to the invention of the felt washer or beater, and soon came the dryer to meet another "long felt want." The dryer, designed to dry the paper in the web or the continuous sheet, and thus do away with the primitive and laborious loft drying, was an iron cylinder, generally about ten feet in diameter. In this was arranged a stove heated with wood, fed into it through a door in the cylinder. After this came the steam dryer, the cylinder washer in the rag engine, the machine for sizing paper in the web, size rolls for sizing paper without felt or jackets, the lay-boy for taking paper from the machine, and the wet lay-boy for handling wet paper.

In 1830, Phelps & Spafford, of Connecticut, manufacturers of paper-making machinery, constructed a complete machine with making - cylinder, press - rolls, steam drying cylinder, reels and cutter, connected so that at last it was possible for the paper maker to take in the pulp at one end of his machine, make the paper, dry it, cut it into sheets of the desired size, and turn it out, ready for finishing or packing at the other end of the machine. All this had been accomplished while the Fourdrinier machine, finally more famous, was being experimented with in England, and introduced into the industry abroad.

During the forty-five years following 1838 there was a decided quickening of the inventive impulse in the paper manufacturing field. Whereas, in the first part of the century, only eighty-eight patents had been taken out, an average of only a little more than two a year, there were now taken out one thousand and seventy-three, an average of more than thirty a year. Of this number, nine hundred and twenty-five were for various kinds and modifications of machinery, and

(From an old wood engraving)

Another of the Group of Early Pioneer Paper Mill Men of Western Massachusetts, David Carson

(Courtesy, Tileston & Hollingsworth, Boston)

Still in Use, a Portion of This Old Tileston & Hollingsworth Mill Makes Paper Today as Oldest Operating Paper Concern in America

for methods of making paper; two hundred and fifty-four were for machinery and for treating rags and making pulp; seventy-nine were for making paper bags, ninety-five were for making paper collars, and sixty-six for making paper boxes.

The old mill men were slow in approving the new machines, long clinging tenaciously to the hand process. In this they were only giving another exhibition of the characteristic antagonism of workers in all times against the introduction of machinery in all industries. An incident has been related illustrating this aversion to the new methods, in a mill where cylinders had been introduced. "Gears had been ordered to admit of speeding the machine ten feet per minute faster, on hearing which the old machine tender, who was short and fat, expressed himself by stating that when a machine was run faster than a man could walk it was time to quit; and quit he did."

Application of power in the second quarter of the century and the gradual introduction of the paper making machines brought about decided changes in the industry. Before that, labor was high, and, consequently, the cost of production was excessive. To a certain extent machinery remedied this. The Hollander, the cylinder and the Fourdrinier were improved again and again, and other mechanical expedients, simple, but efficient, were devised. Especially in the United States manufacturers made more progress than in France and England, in the practical utilization of the new machines and new processes. Turning attention to producing the best qualities of paper they were soon able to place their machine made paper in successful competition with the foreign hand made.

This much had been quite surely accomplished by the middle of the century. Nearly all the mills, particularly those that were newly built, had been equipped with Hollanders, Fourdriniers or cylinders and other machinery. Even the old single vat mills had come into line, and there remained few of importance that any longer made any pretense of making paper by hand.

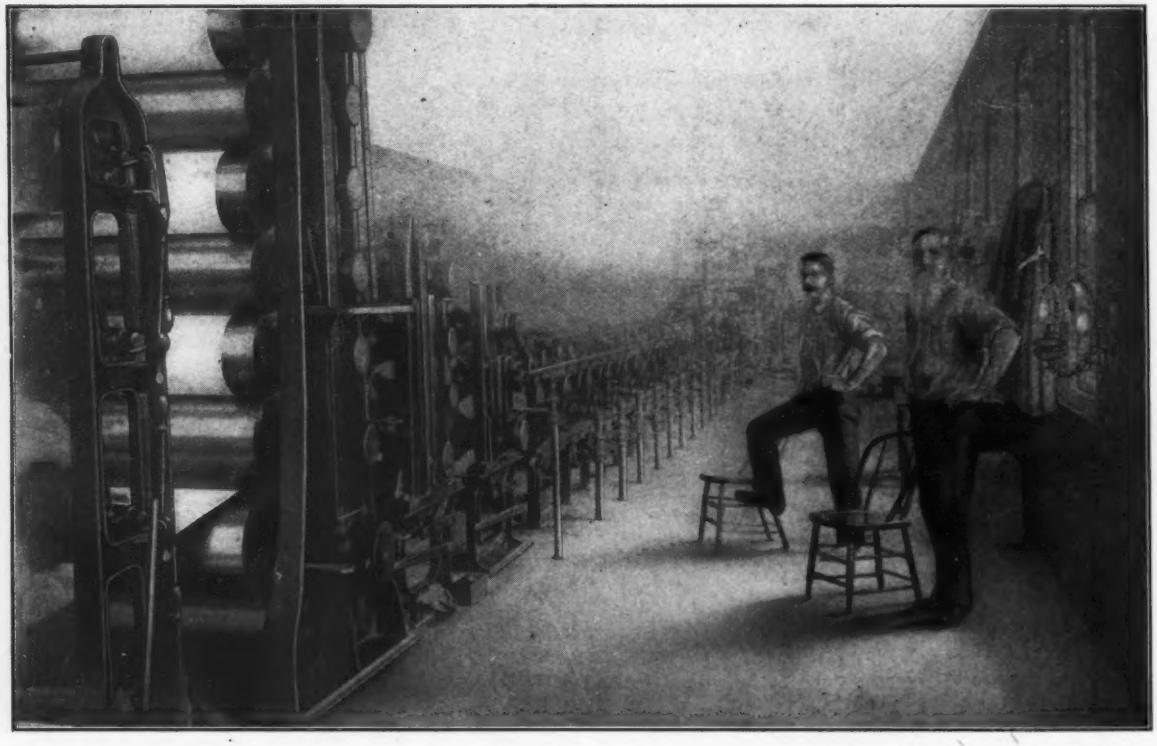
CHAPTER VIII

Paper Machinery Recasts Entire Business of American Mills

THE interval from 1830 to 1840 was important for the vast improvements made in paper manufacture, by the application of machinery, and, also, by the introduction of the use of chlorine, in the form of gas; of chloride of lime, and the alkalies, lime and soda-ash, in bleaching, cleansing, and discharging the colors from calicoes, worn out sail, refuse tarred-rope, hemp, bagging, and cotton waste, the refuse of the cotton mills. These articles, which, heretofore, had been considered only applicable for the manufacture of coarse wrapping papers, have, through the application of this bleaching and cleansing process, entered largely into the composition of news and printing papers.

In 1828, the newspapers of New York State consumed, annually, fifteen thousand reams of paper, the price for which was from four to five dollars a ream. All the newspapers in the United States, at that time, used about one hundred and four thousand reams, valued at half a million dollars. This, although not the only source of increased demand upon the mills, was, with book publishing, quite the largest. To meet this increasing demand, many new mills came into existence, with machinery and other improvements. Expansion of individual plants, at increased cost, naturally followed. Where, previously, it was possible to build and equip a fairly good mill for $10,000 or less, an investment at that time represented at least double, triple, or quadruple that amount, and even more.

In 1831, the New York Journal of Commerce, commenting upon improvements made in the paper industry, said that development had been so great, in the preceding five years, that it now used on its presses a sheet of paper one quarter larger than before, and costing one quarter less. As years passed, progress was more and more marked. Large mills steadily increased capacity, and, in every way, adapted their methods of manufacturing and supplying the market to the new and changing business conditions. In 1848 the New York Journal of Commerce again expressed its astonishment at what was happening in the paper trade.



(Courtesy, Tileston & Hollingsworth, Boston)

Old Fourdrinier in the Days of Long Beards and Short Rolls

"We were informed, a few days since, by a large paper dealer in New York, that it was not uncommon for him to have in his warehouse, and sell at nine o'clock in the morning, paper which was in rags a hundred and fifty miles from New York at nine o'clock of the previous morning. A better illustration of the power of steam could not be given, or of the progress of the age. The rags are placed in the duster, thence conveyed to the troughs or vats, where (in some kinds of paper) the sizing is mixed with the pulp, and from these vats the paper passes over heated rollers, and, finally, between two immensely heavy iron rollers, which give it the glazed surface, and it is then cut, folded, packed, and sent to the railroad, all in the course of a few hours. The telegraph enables New York merchants to order paper in Massachusetts at any moment, and receive the returns, manufactured, and even ruled by almost the next steamer."

In 1829, there were sixty mills in Massachusetts, only six of which used machinery. About one thousand, seven hundred tons of rage were consumed annually, producing paper to the value of $700,000. No gathering of statistics, concerning the manufacture of the State, was systematically undertaken until eight years later. In 1837, the general court of Massachusetts directed the assessors in the towns of the commonwealth to return to the Secretary of State information in regard to the various branches of industry in the Sate. Secretary of State made a report, which was published in 1838.

In this report, returns for paper manufacturing showed that then there were in operation in the State eighty-nine mills. Total amount of capital invested was $1,167,700, the number of employees were five hundred and sixty-eight males and six hundred and five females, and the annual product was nine thousand and nineteen tons of paper, valued at $1,544,230.

Connecticut still held its position as a leading paper manufacturing State, ranking fourth in the amount of annual production, by the census of 1840. Most of the printing paper was used by the newspapers of the State, and by the publishers of books in Hartford. Then Hartford was a publishing center, being surpassed only by New York, Philadelphia and Boston. Considerable of the paper-making was concentrated in Hartford county, especially in and about the town of Manchester, on the Hockanum river.

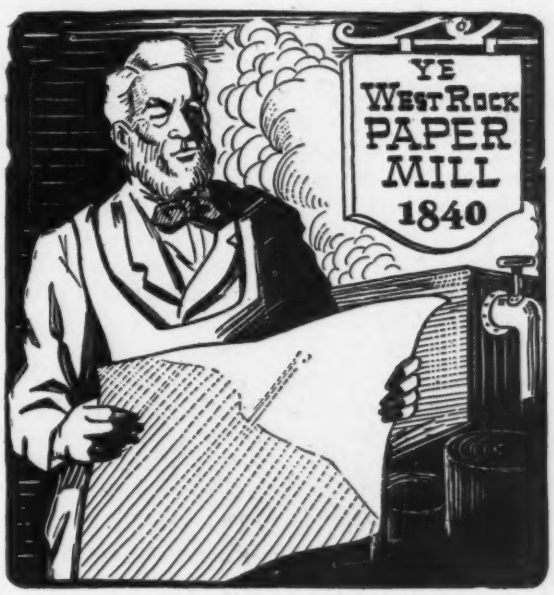
For fully fifty years, Columbia county, in New York State, was noted for making paper from straw. Before 1825, there had been mills in this region, small affairs, making paper of the regulation kind, and in the regulation manner. In 1830, two paper-makers, Hamilton and Wright, came from Connecticut to Chatham Four Corners. They brought with them knowledge of the workings of the new cylinder, with plans of the machine and were pioneers on straw wrapping paper in that section of the country.

Another mill for straw paper was erected by Ebenezer Backus and Thomas Wheeler, not far from the original Hamilton and Wright mill. It was locally known as the "mud-mill", on account of the generally dirty condition of the water of the brook from which its supply was drawn.

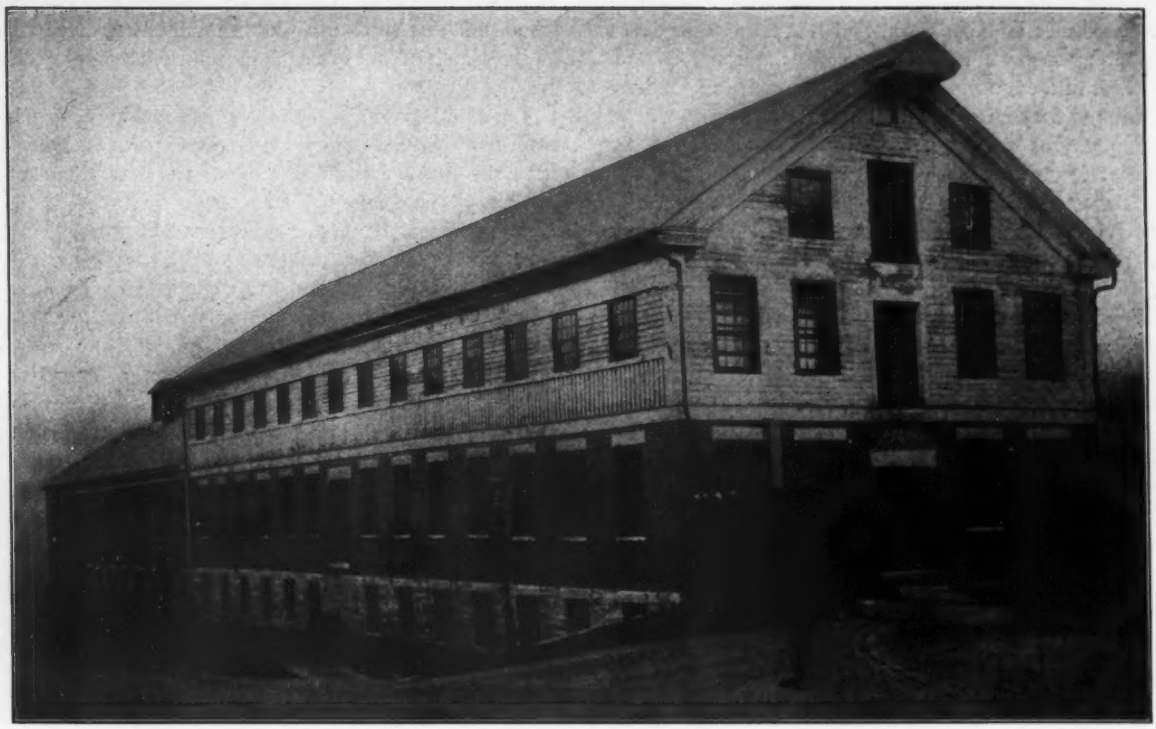
These mills were the pioneers in the making of paper from straw in this county. Rye straw, for stock, came from the farms around and about, and was abundant and cheap. The paper was not exclusively straw—about twenty per cent hard stock, rope and bagging, being used to make the sheet run good. Mills of Wright and of Backus & Wheeler had fire dryers, being the first straw mills in which paper was not loft dried.

Soon afterwards, the making of paper from straw flowed over the border line of Columbia into Rensselaer county. In 1845, John B. Davis purchased a site for a mill on Kinderhook Creek, in the town of Nassau, and, in the following year, associated with Peter C. Tompkins, he built the first mill for straw wrapping in that county. It was the largest mill that had yet started on straw, planned for four thirty-inch Hollanders and a thirty-six inch cylinder. With two engines and a drying loft, in the beginning, after a few years the mill had other engines, a forty inch cylinder and steam dryers. It had two large square bleach vats, whereas, prior to this date, the mills of Columbia had only one.

The Ivy Mills of the Wilcox family, in Chester, Pennsylvania, were still at the height of their prosperity at this time, more than one hundred years from their beginning. In every way they still ranked among the leading establishments of the country. For nearly one hundred years, and in the possession of three generations of the Wilcox name, the Ivy Mills were mostly devoted to the manufacture of hand made bank note paper, and, in this, they were preeminently distinguished. This record is remarkable, and has not been



An Olde Symbol—Past the Century Mark 'Ye West Rock Paper Mill—1840'



(Courtesy, L. L. Brown Paper Company, Adams, Massachusetts)

In Two More Years the L. L. Brown Paper Company Will Be 100 Years Old, and This is the Old Mill, Established in 1849

surpassed, even if rivalled, by any other concern in the industry.

In 1829, the old mill, which had been running one hundred years without interruption, was torn down, to make way for another building on the same site. Two other buildings were added at Glenn Mills, two and one half miles from Ivy Mills, one in 1837, and the other in 1845. In both these, machine-made paper was produced. During the first year of the civil war the demand from the United States government (for bank note paper) was so large that the facilities of the "hand-made" mill were overtaxed, and much of the paper was machine made in the two mills that had been last built. The Glenn mill was in operation into the twentieth century, but no longer by those of the Wilcox name.

Paper making in Indiana was begun by Isaac Mooney in 1826. Mooney, who had been employed in paper mills on the Little Miami river in Ohio, went to Indiana, and there erected a two vat mill, the first in the State, on the Big Creek, about twelve miles north of Madison. Within a year Mooney died, a suicide, and his mill was bought by Alfred McDaniels, who had a paper warehouse in Cincinnati, and was also selling agent for Kugler of Milford and Phillips & Spear, of Cincinnati. McDaniels, after a short time, sold the mill to Hezekiah Stout, who converted the plant into a grist mill, that being the end of the first attempt to start paper manufacturing in the Hoosier State.

In 1827, a second two-vat mill was built by John Sheets, a native of Virginia, who had been living in Warren county, Ohio. This was located on Indian Kentuck creek, several miles east of Madison. In 1832, a machine was put in, and the first air-dried binders' boards in Indiana were made. Later, this also became a grist mill.

Leeds, Jones & Bissell built a one vat mill in Richmond, Indiana, in 1831. The mill had a single one hundred and twenty-five pound beating engine. Within ten years it had another vat, a second engine, a wet-machine and a fire dryer. These additions indicated the general character of the gradual improvements in all the small mills of the western country in this period. In 1837, the business of this mill was incorporated, and, in the possession of various owners, it existed until after the middle of the century.

Several other mill enterprises in Indiana dated from the mid-century. For about twenty years, Rhinehart & Robertson, Rhinehart & Wood, and Rhinehart & Bowen successively operated the first mill in Delphi, built by George Robertson in 1846, burned in 1849, and rebuilt in 1851. The mill was run mainly on wrapping and news. Another mill in Delphi was built in 1853 by Robertson & Wood. In 1859, Beckitt & Gridley built the third mill in Delphi, equipping it with four engines and a sixty-two inch double cylinder. Both owners were spiritualists, and it has been said that, while the mill was under construction, they held nightly seances, and were instructed by ghostly advisers in the work of building and setting up the plant. But their familiars appear to have been evil spirits, for the mill

was a failure from the start, and, within a year, was burned.

The first mill in Logansport was built in 1857 by William Archer & Son. It was operated, first by the Archers, and then by James L. Baldwin until 1868, when it was dismantled, and the building transformed into a distillery. A second mill, near Logansport, was owned and operated by Eldridge & Bachman. The first mill in Elkhart was built in 1850 by E. R. & C. Beardsley. It was located in Christiana creek, and had a fifty-six inch cylinder. Six or seven years later another mill was added under the same roof. Later, a sixty-two inch machine was put in for the purpose of running print-paper, the other machine being used exclusively on wrappings. The mills were the foundations of the Elkhart Paper Company, which became the owners in 1868, and enlarged and improved the plant.

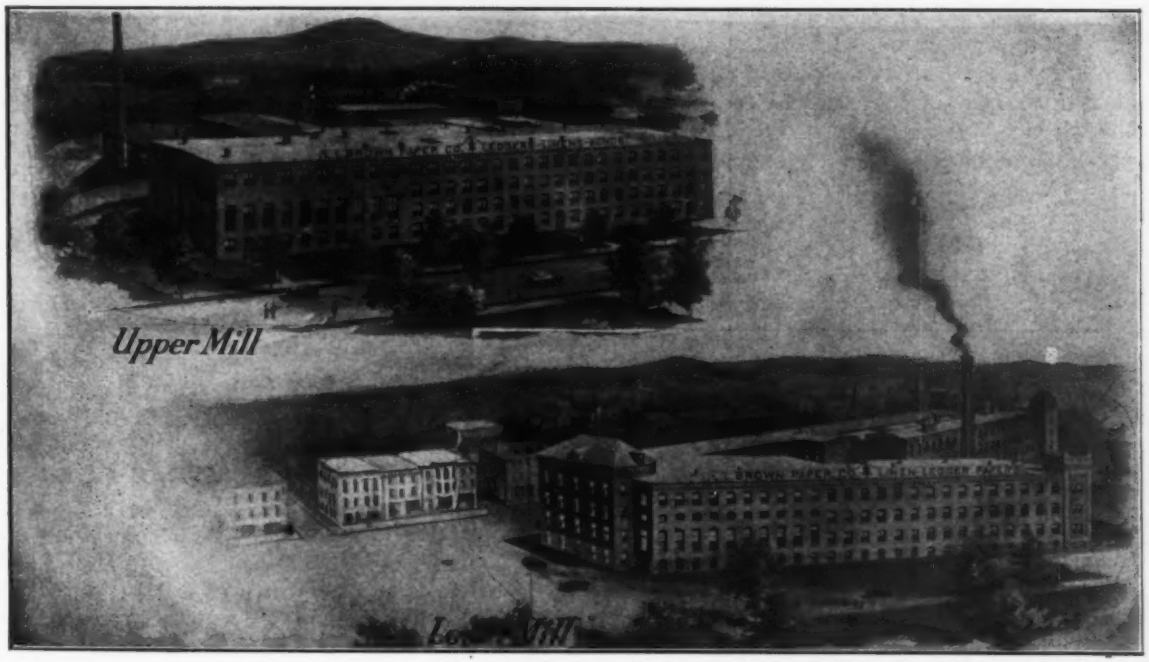
It is small cause for wonder that, after the failures of 1810 and 1820, no attempt was made to gather statistics of manufacturing throughout the country until the census of 1840 was ordered. But the third decennial effort was not much of an advance over those that had preceded it, being meagre in detail, and very inaccurate. The returns gave the aggregate amount of capital invested, in all manufacturing in the United States, as $267,726,579, and the number of persons employed as 399,307. The actual facts, however, were undoubtedly in excess of those reported by the official enumerators.

The number of paper mills reported were four hundred and twenty-six, in twenty States and the District of Columbia; men employed, four thousand, two hundred and twenty-six, with no record of female employees, of whom there were many; capital invested, $4,745,239; annual value of product, $5,641,495. The industry was still largely confined to the eastern part of the country. Massachusetts, with eighty-two mills, was first in capital invested, $1,082,800; in number of employees, nine hundred and sixty-seven; in value of product, $1,659,930. Pennsylvania had eighty-seven mills; capital, $581,800; employes, seven hundred and ninety-four; product, $782,335. New York had seventy-seven mills; capital, $703,550; employes, seven hundred and forty-nine, product, $673,121. New Jersey had forty-one mills, capital, $562,000. Connecticut had thirty-six mills, capital, $653,800; employes, four hundred and fifty-four; product, $596,500.

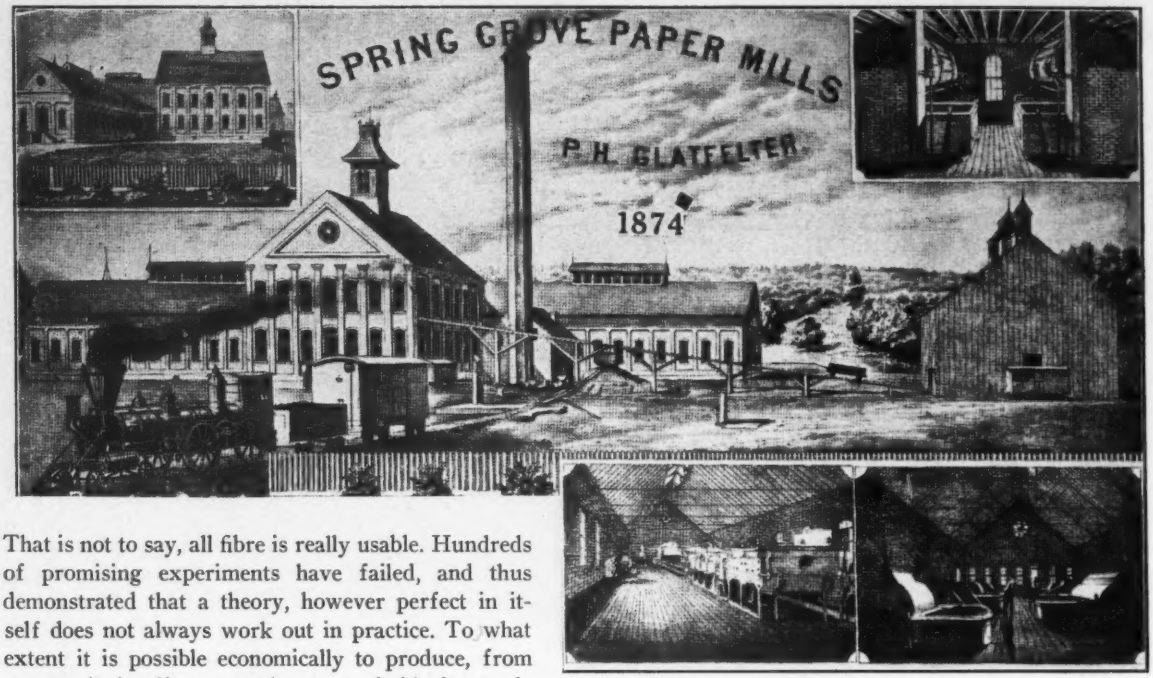
Volumes have been written and other volumes might still be written about man's quest for material for paper, and without exhausting the subject. Trouble began immediately with discovery of the utility of a pulp prepared from a vegetable fibre. For their raw material the Chinese, who first used this new process, took rice, the bark of the mulberry tree, bamboo, cotton, linen and hemp. But, with the extension of the art elsewhere in Asia, and thence into Europe, the necessity of finding other substances for this purpose gradually sprang up, and, as the time went on, became more and more an impressive factor in the development of the industry. The history of paper making in Europe, and in the United States, is shot through and through with the records of persistent speculating and experimenting in the endeavor to escape from the limitation imposed upon it by sole dependence upon rags.

Broadly speaking, all fibrous vegetable material, from whatever source derived, can be used for paper making.

Present Ledger, Linen, Bond Mills of the L. L. Brown Paper Company



(Courtesy, L. L. Brown Paper Company, Adams, Massachusetts)



Glatfelter Paper Mills in 1874

That is not to say, all fibre is really usable. Hundreds of promising experiments have failed, and thus demonstrated that a theory, however perfect in itself does not always work out in practice. To what extent it is possible economically to produce, from any particular fibre, a good paper, suitable for needs of the time, is always a debatable question. It is one thing to make hundreds of reams as an experiment, and quite another thing to make thousands upon thousands of reams that will be continuously marketable. The item of cost is the controlling factor in every instance, but there are minor considerations, such as quantity and quality available, adaptability, and so on. A technical success, and a commercial surety, are not necessarily synonymous.

Materials which have been generally considered most suitable for pulp purposes are: raw cotton, fibres of flax jute, hemp, ramie, paper-mulberry and manila, stems and leaves of straws and grasses, such as esparto, corn sugar cane, bamboo and cotton stalks, various kinds of wood, commonly spruce, hemlock and poplar, although pine, balsam, cotton wood, fir larch, aspen, cypress, beech, birch, maple chestnut and other woods are also usable. Beyond these and even within their field, experimenting has gone on extensively and always hopefully, despite discouragements, disappointments.

Many lists of substances that have been tried have been made up and often printed. In one, upwards of a hundred different substances were included, some of the most notable of which were: trees of all kinds, alga, aloe, asbestos, asparagus, bagging bamboo, banana, beet root, blue grass, bran, Brazilian grass broom corn, burdock, cabbage stumps, coconut husks, cotton seed, cotton stalks, corn husks, couch grass, palm, esparto, ferns, flag leaves, flax, floss silk, frog spittle, grape vines, gutta percha, hay, hemp, hollyhock, hop-vines, ivory shavings, jute, leather cuttings, leaves, manure, marshmallow, moss, mulberry, mummy cloth, nettles, oakum sacking, peat, plantain, raw cotton, reeds, rice, straw, ropes, rushes, sawdust, sea weed, silk, sorghum, straw, thistles, tow, water broom, and wool.

In 1860, The New Orleans Bulletin stated that it had been shown seven different kinds of material, growing in Louisiana, and specimens of fibre made from eleven different kinds of material, also growing in Louisiana. Some of the threads were described as being of delicate floss-like substance, nearly equal to silk, while others were strong, like hemp. It was asserted that paper could be made of various colors, and of any quality, from the finest white letter and silk paper to the coarsest wrapping paper, and from materials that were abundant; bagasse, the refuse of sugar cane, cotton stalks, wild indigo and banana.

In 1869, experiment were made in California with tule, a swamp land product, which was said to give a good quality of paper. Scarcity of rags on the Pacific Coast affects manufacturing a great deal, and the two mills then in California complained that they found it more profitable to make wrapping than printing paper. About the same time a manufacurer in Buffalo, New York, came forward with a claim that he could make wrapping paper better, tougher and cheaper, from wire-grass than from any other material then in use. The grass could be procured from Michigan, and cost thirty dollars a ton. The Portland Advertiser, of Portland, Maine, in 1869, tried the experiment of printing on paper made from water rice, which grew in great quantities in the northwest, and the customary prediction of a paper-making revolution was quickly followed by the customary failure.

Great expectations were based upon peat, in the latter part of the 19th century. It was plausibly argued that the quantity of peat in the world is enormous, and that the fibres derived from it would furnish a substitute

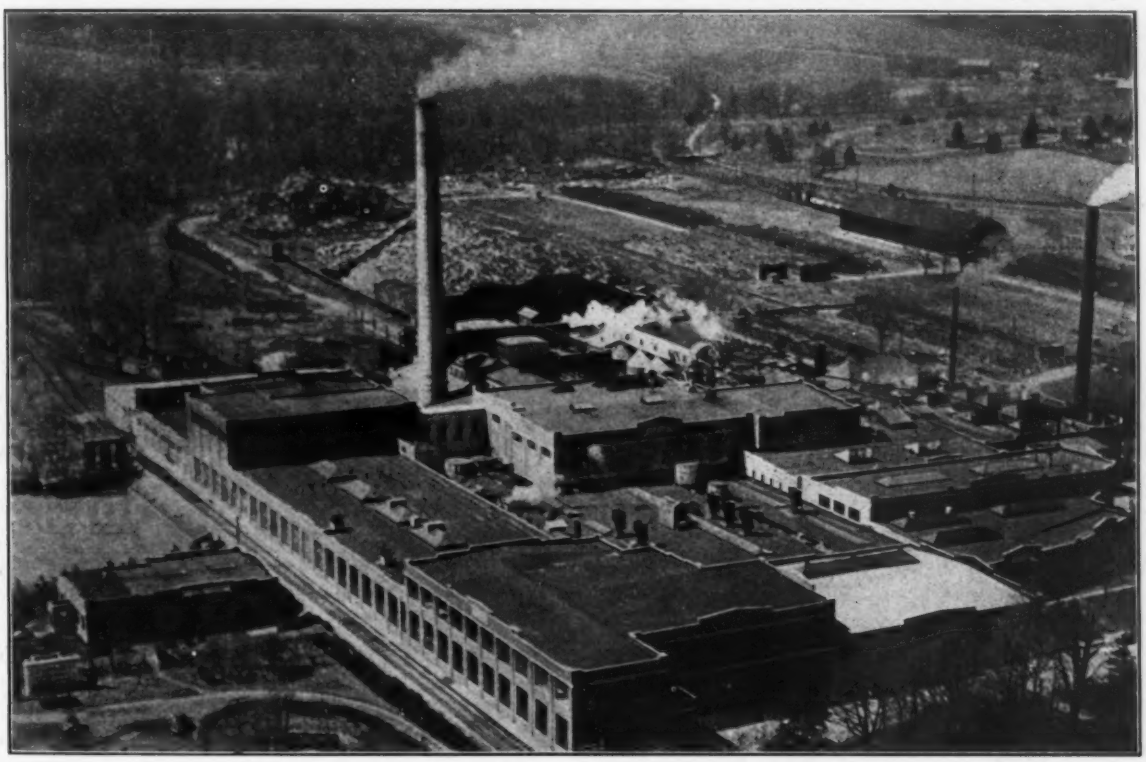
for wood for boxboard and wrapping paper. Low cost production, less than one half the cost of straw board, was an item in its favor. An attempt to work the bogs of peat was first made in Ireland, and there failed. Another attempt was made in Sweden, without success. In the United States, the business was established on a substantial scale by the Pilgrim Paper Company in a mill near Capac, Michigan, in 1906. The plant turned out thirty tons of box board every 24 hours. Notwithstanding its apparently promising start this "peat to paper" business fell by the wayside, after a few years.

The foregoing may well conclude a review that has been resultory, rather than exhaustive, and that has pointed out the fact that most of the search for pulp material has been utterly futile, while much has been ill-considered, or even fantastic. When all else has been disposed of, we come, finally, to our great staples, —rags, straw, wood and jute. And the greatest of these once was rags, and now is wood. Esparto would be included if this was a history of paper manfacturing in England, but its use in the United States has always been negligible. Until well after the middle of the 19th century the history of paper, the world over, at least in Europe and on the western continent, was, in one sense, a history of rag-gathering, for no other material's were, to any great extent, available.

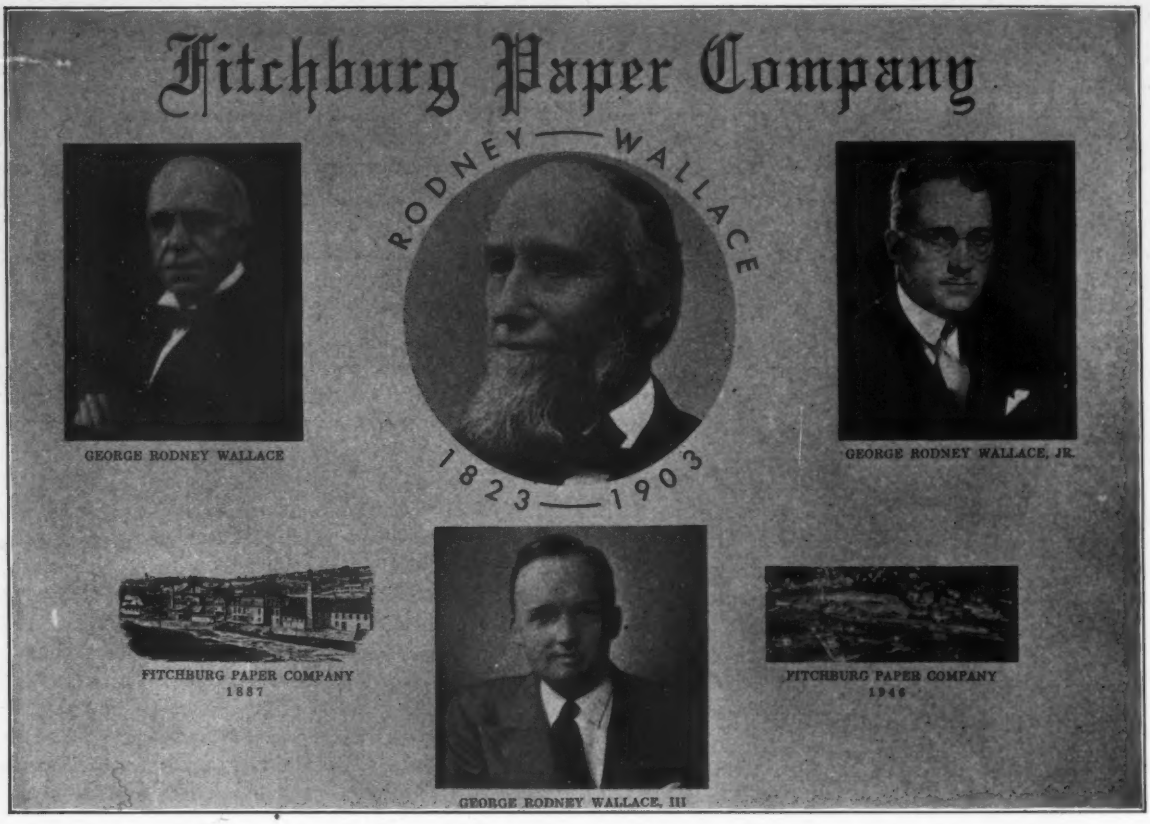
In the United States rags and rags only were the fundamentals in all paper making for more than a century and a quarter, when straw first came in, and wood long after. During most of this period the mills depended almost entirely upon the domestic supply, and their often desperate conditions, by reason of the dearth of rags, has been described elsewhere in this history. Not before 1800 did the United States draw much in the way of rags from Europe, and, at the end of the first decade of the century, importations were still slight. Then a change set in. A veteran paper manufacturer, of that period, described the situation that then existed:

"About the year 1810 we began to experience a deficiency of raw material (rags) and were obliged to resort to Europe for supplies. At present (1850) we have an additional inducement to import our material. The article of cotton has here almost entirely superseded the use of linen for wearing apparel, and, when much worn and reduced to rags, becomes a very tender substance; in fact, scarcely able to support its weight when made into paper. The foreign rags, we suppose, average about 80 per cent of linen, which, when mixed with the domestic cotton, impart to the paper a strength and firmness which it could not have without it. The best qualities of writing and printing papers contain from 30 to 50 per cent of linen, for which we are entirely depending on foreign countries. But, as the use of cotton for clothing is yearly increasing, all over the civilized world, we find the proportion of linen in imported rags decreasing from 5 to 10 per cent, from year to year. We have an excellent substitute for this

Modern Glatfelter Mill at Spring Grove, Pennsylvania



(Courtesy, P. H. Glatfelter, Spring Grove, Pennsylvania)



(Courtesy, Fitchburg Paper Company, Fitchburg, Massachusetts)

An Old Organization—And Still Going Strong

in our country, did not its high price prevent its use—raw cotton—which makes a beautiful paper, when mixed with the worn out rags of the same material. In 1837-38, when the price was as low as 6 cents per pound, large quantities were manufactured into paper."

Straw was the first new material that was brought to supplement rags to any substantial extent. Experiments with straw had long been made in Europe and in the United States before a practical method of using it was discovered by a Pennsylvania man.

William Magaw, of Meadville, Pennsylvania, was engaged in the manufacture of potash in 1827 and after. The hoppers that were used were lined with long straw before the ashes were introduced, and Magaw, in handling the straw, discovered that, by macerating it, he could produce a substance that was very like the rag pulp out of which ordinary wrapping paper was made. On this idea he secured a patent, March 8, and May 22, 1828, and at once began manufacturing in a small way. The paper that he made was of a faint yellow color, but strong and durable, and, after it came to be machine-made, was sold for less than two dollars per ream, imperial size. It has been said that an edition of the New Testament was printed on it at a cost of five cents a copy, and, in 1829, it was used for several issues of Niles' Weekly Register.

For many years the Magaw process practically had the field to itself. As time went on, however, new methods of treating straw were devised, and improvements made. Eventually, the Flat Rock mills were making 2,600,000 pounds of straw paper annually, or about ninety-three thousand reams, newspaper size, worth about $450,000. Six hundred tons of rags were used, three thousand tons of straw, five hundred tons of soda ash, four hundred tons of bleaching powder, and two thousand tons of coal.

Paper from wood was a reality, from time immemorial. Passing by the Chinese usage of the mulberry and other trees, paper makers in Europe never ceased trying to extract fibres from all kinds of trees, but without material or enduring success until well into the middle of the 19th century. Concerning nearly every experimenter, it is impressively declared the idea was suggested to him from observation of the fibre of wasps' nests. Reaumur, the French scientist, in an essay in 1719, pointed out this, and, although it was claimed that he was the first, it is quite likely that others had anticipated him in this observation and conclusion. He had numerous followers, down to Keller. But, for more than a hundred years after Reaumur, the wasps continued to succeed, while their more ambitious human imitators were conspicously failing.

In the United States, Matthew Lyon, of Fairhaven, Vermont, made a fair quality of paper from the bark

(Courtesy, Case Brothers, Inc., Manchester, Connecticut)

Another 75th Anniversary Mill—Case Brothers' Old Buildings at Highland Park, South Manchester, Connecticut, in 1872

of the basswood, and there were others in the field in his time, and later. Lewis Wooster and Joseph E. Holmes, of Meadville, Pennsylvania, got out a patent in 1830 for making pulp from wood. They used lime and aspen trees, and their process, which was chemical, required one hundred pounds of wood for five to seven reams of paper. In 1834, Daniel Stebbins, of Northampton, Massachusetts, tried the bark of foliage of the mulberry tree. He had a nursery of trees, which he had raised from seeds imported from China. This was when the craze for cultivating the silk worm had appeared all over the eastern part of the United States, and mulberry plantations were to be as common as apple orchards. But the silk culture experiment failed and so, also, did that of pulp from the mulberry, although a few reams of excellent writing paper were produced.

Milton D. Whipple, of Charleston, Massachusetts, in 1855, patented a method of preparing wood for pulp by grinding wooden blocks on a stone, and, in the same year, Louis Koch, of New York, devised machinery for separating the fibres, without destroying them, by means of a series of rollers. An improvement in the treatment of stuff by chemical process was the subject of a patent by Julius A. Roth, in 1857. Charles Marzoni, of New York, in 1858, took out a patent for reducing wood to pulp by mechanical means, using an "adamantine" stone, with steam and hot water. In the same year, Henry Voelter patented his method of using a rotary grinder, or millstone, for abrasing the wood. In 1863, several patents in this field were taken out. Stephen M. Allen, of Woburn, Massachusetts, patented a process of crushing the logs of wood longitudinally, to preserve the integrity of the fibres, which were then boiled, ground and bleached. Professor Chadbourne, of Williams College, came out with a process which combined chemical and mechanical principles, and which was expected to reduce the cost of pulp to one half. George E. Sellers, of Hardin County, Illinois, took out a patent for preparing fibre by vertical pressure.

Several years of fruitless experimenting, principally in the town of Reading, England, preceeded the final success of Hugh Burgess and his partner, Charles Watt, in making pulp from wood by chemical process. In 1851, they were at last able to show good pulp by their method, and, from this, white paper, suitable for print-

New Mill of Case Brothers, Inc., on Same Site as 1872 Mill

(Courtesy, Case Brothers, Inc., Manchester, Connecticut)

ing, was made in a paper mill in Boxmoor, Hertfordshire, England. Part of a weekly issue of The London Journal was printed from this paper, and it passed the test full well. The Burgess invention, simply stated, was the producing "of a good pulp by boiling wood in caustic alkali at a high temperature" with the substitution, or addition, in some instances, of chlorine or the hypchlorites for the caustic alkali. At that time, paper for printing commanded 40 pounds sterling in London, made, of course, entirely from rags, and it was hoped that the price could be reduced nearly one-half if pulp from wood could be had.

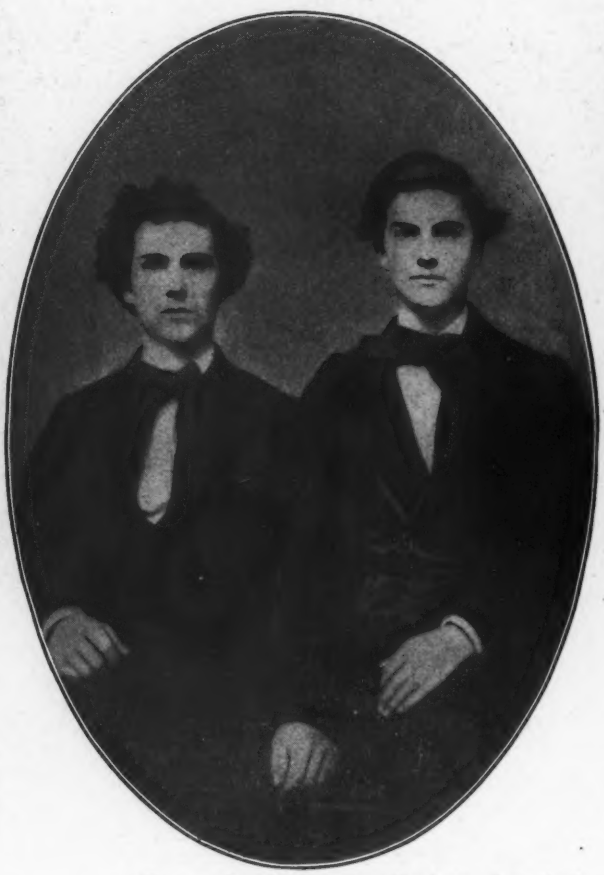
The process was patented in England in 1852, but the new pulp did not meet with prompt acceptance there. Disappointed, Burgess came to the United States with his invention in 1854, and secured a patent here, in that year. In this country he joined with Morris L. Keen, of West Philadelphia, who had been working upon a mechanical process of deriving pulp from wood. Burgess and Keen conducted further experiments in an old engine-house of the Wilmington & Philadelphia Railroad, at Gray's Ferry, on the Schuylkill river, near Philadelphia, where Keen also had a lumber wharf.

landville, near the paper mill, and also by Megargee Brothers and J. Howard Lewis. Larger mills were built at Royers' Ford, on the Schuylkill, the following year, and, for nearly forty years, work was carried on there, with Burgess as manager.

Prejudice for the new pulp was not easily overcome. For a long time many manufacturers held stubbornly to the opinion that, while wood-pulp might be a good filler, it was not a good fibre. Gradually, however, soda-pulp won its place into acceptance. Jessup & Moore and Matin Nixon became early and large users of it, and others followed. For a long time there were sceptics. One critic wrote thus scornfully of the process:

"The great bamboo enterprise was thrown into the shade by another which was organized for the production of paper from poplar, and located at Manayunk, on the Schuylkill river. It had been discovered that poplar could be manufactured into paper in twenty-four hours, and with so much economy that it could be sold, so as to afford a profit at 10 cents a pound. Works were accordingly constructed of stone and brick (the Jessup & Moore mill) in the most substantial manner,

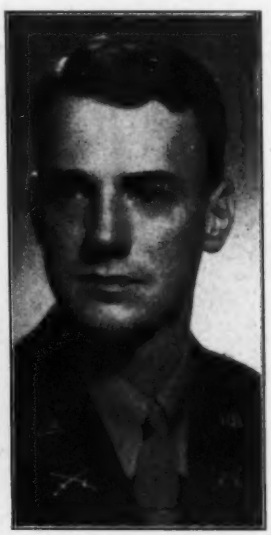
Wells Case Dennison
Vice President
Case Brothers, Inc.



(Courtesy, Case Brothers, Inc., Manchester, Connecticut)

Civil War Paper Mill Twins

Left, A. Wells Case; Right, A. Willard Case, who started business in 1861, making album board and binder board with another brother, Fred L. Case.



Robert Case Dennison
Vice President
Case Brothers, Inc.

The experimenting period lasted several months, and, during that time, various raw materials were tried—wood, straw, corn-stalks, bamboo and cane, none being found as suitable as wood. First pulp was made into paper in the Warren mill, of May-

occupying a space 1,000 feet long by 350 feet wide, at a cost of over $500,000. United with the Flat Rock mills (Feinour & Nixon) they were represented to embrace an area of about ten acres; and were thought to be the most extensive works of the

Miamisburg Paper Company Mill, Miamisburg, Ohio

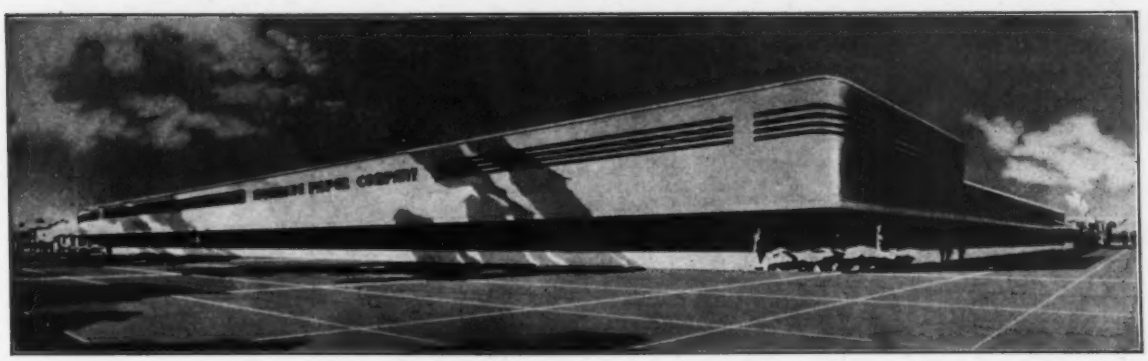
kind in the world, and to be capable of producing from ten to fifteen tons of pulp a day. It was announced in the newspapers, which always exercise an unbounded liberty in figures in such cases, that the subscribed capital in this enterprise was upwards of ten million dollars. The grandest calculations were indulged in the abundant supply of poplar, with the aid of willow and other soft woods, nearly valueless for fuel; and were to result in as great a boon to civilization as the steam engine and the magnetic telegraph."

In 1863, the business was organized as the American Wood Paper Company, incorporated with a capital of two million dollars. Works on a big scale were erected at Manayunk, where twenty tons of wood pulp a day were turned out, while, in the Royer's Ford plant nine tons a day were turned out. Litigation, as usual, sprang up, but, for years, the company was able to hold its position as the leading manufacturer of soda-pulp and paper. In this period, Effingham Embree was active in the management. Before the close of the century the company failed, and the Manayunk plant became the property of the Philadelphia Manufacturing Company, and was refitted as a paper mill. Before that time the manufacture of soda-pulp had been established in other parts of the country. Principally, however, it remained in Pennsylvania, where, into the next century, were a third of the soda-pulp mills. Compared with sulphite and ground-wood, soda-pulp has not made a large showing in number of mills or amount of product.

Like many another inventor and discoverer, Benjamin C. Tilghman succeeded and failed; succeeded in discovering something new and practical in an industrial field, and failed to profit from his discovery. In Philadelphia, shortly after the close of the civil war, he experimented with a solution of sulphurous acid, to dissolve the intercellular matter of wood, leaving the fibres to be turned into a pulp suitable for paper making. Result was successful, as to the product finally secured, but an entirely satisfactory method of operation had not been found when Tilghman, after having spent much time and money, ceased his efforts, and went to work in another field.

After Tilghman had abandoned his sulphite experiments, Fry and Ekman, in Sweden, about 1870, carried investigations further, and the improved Ekman process came into practical use, first secretly, until about 1879, and then more openly in England, and, finally, a large mill near London in 1884. The first American paper maker to take up the process, and operate on a commercial scale in this country, was Charles S. Wheelwright, of Providence, Rhode Island. In 1882, he saw the working of the Ekman process in a small mill in Bergvik, Sweden. Although, as there shown, the process was evidently imperfect on the mechanical side, the high grade of the product encouraged Mr. Wheel-

From the Architect's Drawing of the New Moraine Paper Company Building



(Courtesy, Moraine Paper Company, West Carrollton, Ohio, W. Ray Yount, Architect)

(Courtesy, Tileston & Hollingsworth, Boston)

Fourdrinier Paper Machine with 122 Inch Wire

Pagenstechers, Albrecht, Alberto and Rudolph, acquainting themselves with the work that had been done abroad, imported two of the new pulp grinding machines in 1866. They erected a building in Curtisville, near Stockbridge, Massachusetts, and there made wood pulp in March, 1867.

First lot of this pulp was tried in the nearby mill of the Smith Paper Company, under the direction of Wellington Smith, and the experiment was so satisfactory that the company contracted to use all that the Curtisville mill could turn out; for a year it had a monopoly of the new material. In 1869, the Pagenstechers bought the Voelter patent for this country, and, by extensions, the life of the patent was continued until 1884, when it expired.

At the outset, about half a ton a day was the capacity of the little mill in Curtisville. The pulp was formed into cakes by hand presses, and shipped to consumers in barrels. In the Luzerne mill a method, of running the pulp over a wet machine, was adopted, and, thenceforth, it was thus put on the market. Groundwood pulp was first sold at eight cents a pound, but soon dropped to five and four cents, and, eventually, to one cent. It was a prime factor in bringing the price of newspaper from fourteen cents, in 1869, to two cents, before 1900.

In 1868 and 1869, several persons were interested in the process, and small pulp mills were built in Lawrence, Fitchburg and Lee, Massachusetts; Norway, Maine, Lanesville, Connecticut, and Luzerne, New York. The mill in Luzerne was the first to be equipped with machinery made in America, and it was the beginning of the Hudson River Pulp and Paper Company. None of these early mills was a financial success. William A. Wheelwright and his associates to erect, on a large scale, the plant of the Richmond Paper Company, at Greewood Point, East Providence. Pulp of high quality was made, but the mechanical difficulties in the way of practical working were so great that the manufacturers soon found themselves seriously embarrassed.

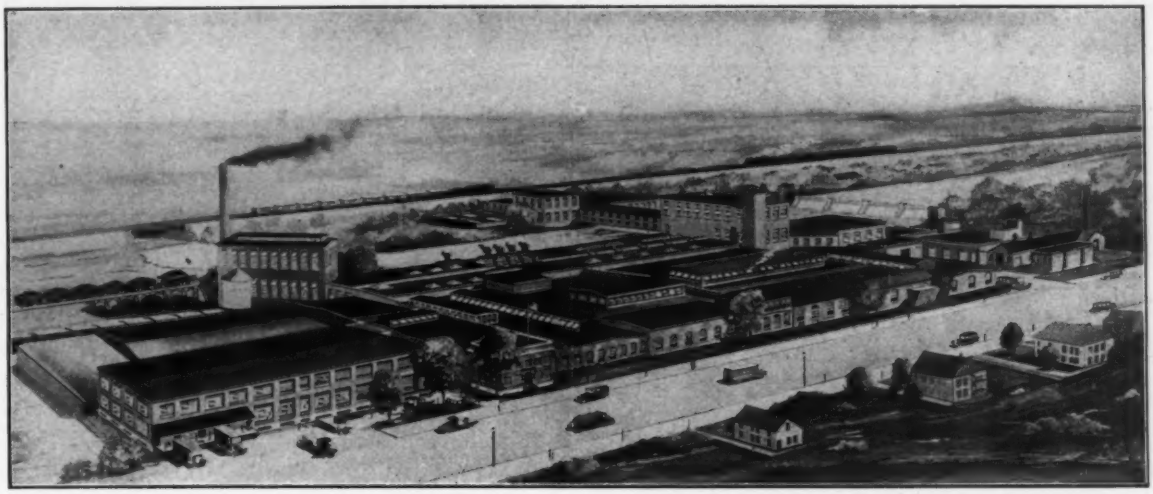
Various forms of digesters were designed by Wheelwright to overcome defect in the apparatus. He took out patents in 1884 and 1886, and was able to reduce the cost of repairs on linings very considerably. Throughout all this period of difficulty the product of the mill was equal, if not superior, to any other in the United States or abroad, at that time and immediately thereafter. Nevertheless, the process could not then be made commercially profitable, and Wheelwright was forced to give it up. The Richmond mill had two Fourdrinier machines, and ran on book and news, producing fifteen tons a day. In 1887, the company failed, with liabilities of $600,000.

In after years the Mitscherlich patents, for the production of sulphite pulp, were brought from Europe to the United States by Augustus Thilmany, who had bought the American rights. The International Sulphite Fibre and Paper Company was formed to purchase the American and Canadian rights, and to enter upon the manufacture. Under the supervision of Thilmany, a mill was built in Alpena, Michigan, by George N. Fletcher and Albert Pack, two lumbermen who were primarily interested because they wished to find some way of utilizing the refuse from their lumber mills. When completed, the plant cost a little over two hundred thousand dollars, and, in the essential parts of its equipment, specifications and details, submitted by Mitscherlich, were carefully followed.

The process was very slow then, from sixty to seventy-two hours being consumed in charging, cooking, and emptying a digester, which had been built to contain about 25 cords of wood. Within a decade improvements had been made in the process, so that cooking was done in from 10 to 16 hours, and 10 tons of pulp a day, from one digester, was not uncommon. In the beginning, sulphite sold at four and a half cents a pound, and, by the end of the century, it was produced for a cent a pound.

Mr. Pack did not long continue in the business, which was carried on alone by Mr. Fletcher, until his death, and afterward, until 1916, by his sons, though groundwood, in the later years there, shared honors with sulphite. Eventually, Michigan lost its preeminence in this branch of pulp making, Maine, New York and Wisconsin, where wood was most abundant, having a majority of the mills.

At the World's Exposition, in London in 1867, and at the Paris Exhibition in 1867, full working plants of the Keller-Voelter process were displayed, but they attracted little attention, although it was shown that mills in Germany were already producing a good quality of groundwood pulp. Not many years elapsed before the process was brought to the United States. The



(Courtesy, Tileston & Hollingsworth, Boston)

Growth and Expansion of Tileston & Hollingsworth Mill from 1728 to 20 Years Ago

Russell, of Lawrence, became acquainted with the work of the mill in that place, and, buying rights for the New England States, built two mills, one in Franklin, New Hampshire, and one at Bellows Falls, Vermont.

About the same time, Warner Miller toook a large interest in the Pagenstecher enterprise, and the construction of the big mill at Palmer's Falls, New York, was begun. Mr. Miller's enthusiasm and energy, in developing the business, were untiring. He was partially successful in combatting attempted infringements upon the patent, which were many, and in securing for groundwood favorable tariff legislation, his activities winning for him the soubriquet "Wood-Pulp Miller."

Another pioneer was Alvah Crocker, of Fitchburg, Massachusetts, who, in connection with his plans of developing Turner's Falls, Massachusetts, into a great mill center, built there the pulp mill of the Turner's Falls Pulp Company, later merged into the Montague Paper Company. In this mill, poplar was used exclusively, one cord of wood producing about one thousand, two hundred pounds of pulp. From 50 to 60 hands were employed, and the output of the mill was from 5 to 7 tons a day.

Thus, was the beginning here of the great pulp process that had, in less than a half a century, completely revolutionized the making of paper the world over, and has rendered negative all efforts to utilize pulp material from other sources. Very soon, groundwood pulp dominated the field. Eventually, straw for printing paper was abandoned, but was continued for boards. Soda pulp fell into a minor position, but sulphite pulp remained as a considerable factor, though proportionately small, as compared with groundwood, its superiority for book paper having been established.

In 1872, when the very first issue of the PAPER TRADE JOURNAL was published, the paper industry was, indeed, entering a new era. All that had gone before was ancient history. Now came the future, the prospect of a paper industry which was to be simply huge, in comparison with the somewhat puny efforts of the past. In the perfection of the pulp and machine age, henceforth the paper industry was to see processing and production to amaze the world, and it was to be accomplished right here in America. For the next three-quarters of a century, then, the modern history of the industry was to be written by PAPER TRADE JOURNAL.

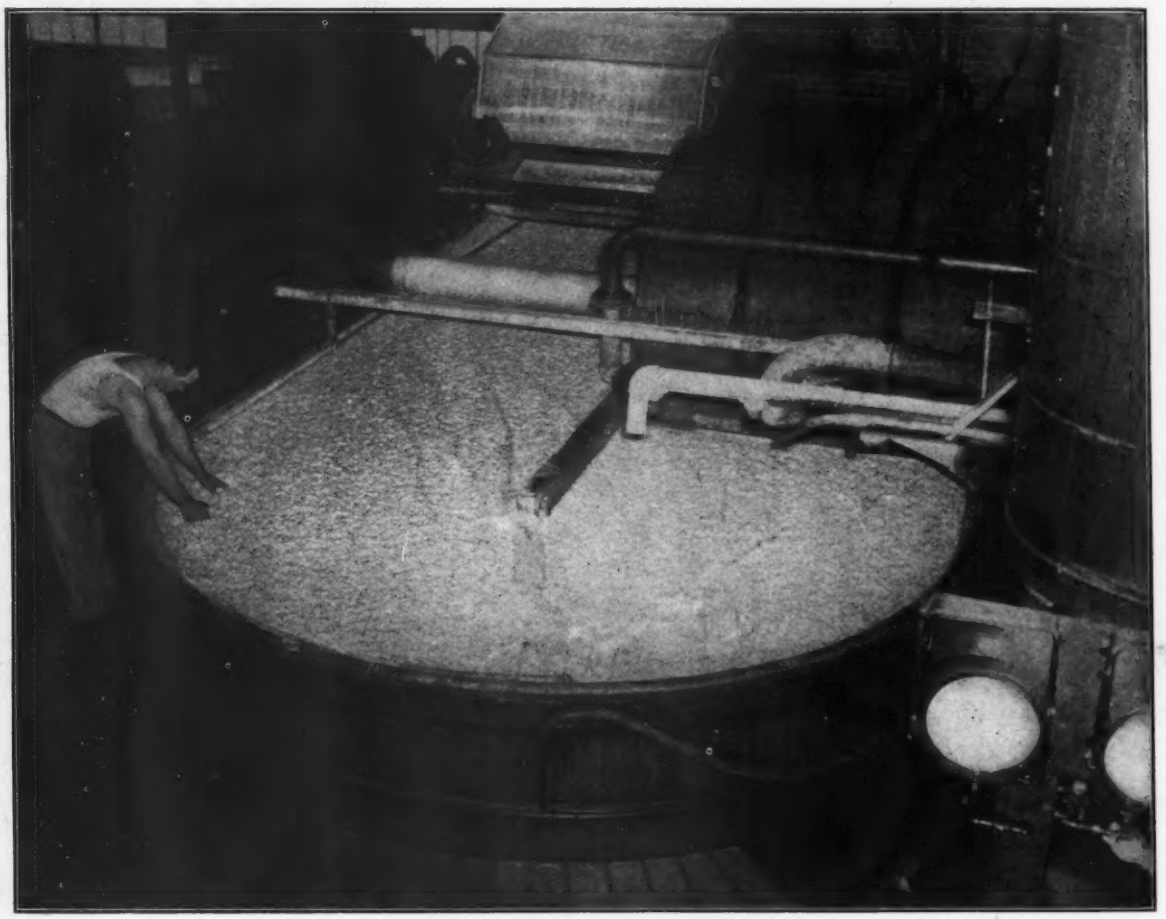
CHAPTER IX

Progress Continues in American Mills

PAPER manufacturing had been established on sound and permanent foundations by 1850, and it advanced to a position as one of the country's solid industrial institutions, even though it was not yet in the front rank. Small, local mills still existed, isolated in all parts of the United States, as they had so existed for one hundred and fifty years, but no longer were they to be particularly reckoned with. Most of them rapidly disappeared under the effect of altered economic and industrial conditions, expanding into larger activity, being absorbed by the on-coming big enterprises, or abandoning the field altogether. Few of them survived, individually and unchanged, until the end of this century. From this point on, a history of the industry is a consideration of it in mass, rather than in the multiplicity of small details about small endeavors.

Paper was not yet a considerable proportion of the entire manufacturing of this country. There were four hundred and forty-three mills, with a capital of $7,260,864, using raw material to the value of $5,555,-929, employing three thousand, eight hundred and thirty-five male, and two thousand, nine hundred and fifty female hands, and producing annually to the value of $10,187,177.

In Massachusetts, the business increased tremen-



The Beater and the Pulp Vat in An American Paper Mill

dously between 1850 and 1855. Throughout this period, Berkshire county continued to hold its position as the section of the State foremost in the number of its paper mills, and the amount and value of products. The Smith Paper Company, which became one of the big concerns of this region, was developed in the middle of this century. Elizur Smith came into the business of paper manufacturing in 1834, when he bought an interest in Ingersoll & Planter's Turkey Mill, Tyringham. In the following year, he became the junior partner of George W. Planter, the firm of Planter & Smith, thus organized, being one of the leading concerns in Berkshire for the next generation. The firm owned and operated the Aetna, the Turkey, the Union, the Enterprise, afterward known as the Eagle; the Housatonic, the Castel and the Laurel. Mr. Planter also built a mill in Ancram, New York, and Mr. Smith, with his brother, bought a mill in Russell, Massachusetts. Planter died in 1856, and, for several years, Smith continued the business under the old firm name. At one time the concern was the largest producer of writing paper in the United States, or, perhaps, in the world.

Holyoke, Massachusetts, as "the paper city," did not come into existence until 1853, long after its neighbors in Berkshire county were firmly established in paper making. Water power from the Connecticut river, by means of dams and canals, was developed after 1847, and then began the making of the city into a great manufacturing center.

Joseph C. Parsons started the business in Holyoke with the Parsons Paper Company, of which he was the treasurer and agent. Parsons was the practical man in the enterprise, and the only one who possessed experience in paper-making. Aaron Bagg was president of the company. The name of the corporation and the business has been continued, to the present time, by the sons and grandsons of Aaron Bagg. E. P. Bagg, Jr., is now president of the company, which currently produces 25,000 pounds or more every twenty-four hours of bonds, ledgers, linen, parchment, and index bristol papers.

The second paper-manufacturing concern of Holyoke was the Holyoke Paper Company, which had a mill built in 1857. Orick H. Greenleaf acquired a controlling interest in the company in 1865, and retained his connection until his death in 1896. In later years, the Holyoke Paper Company was under the management of Oscar S. Greenleaf, brother of Orick.

The Whiting Paper Company was organized in 1865, with L. L. Brown, of South Adams, as president, and William Whiting, treasurer and agent. In the course of time, William Whiting became president of the concern, and his son, William F. Whiting, the treasurer, the latter succeeding to the presidency on the death of his father, with Samuel R. Whiting, as treasurer. The senior William Whiting was connected with the Holyoke Paper Company and the Hampden Paper Company before he organized the corporation that bears his name. Mr. Whiting also

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

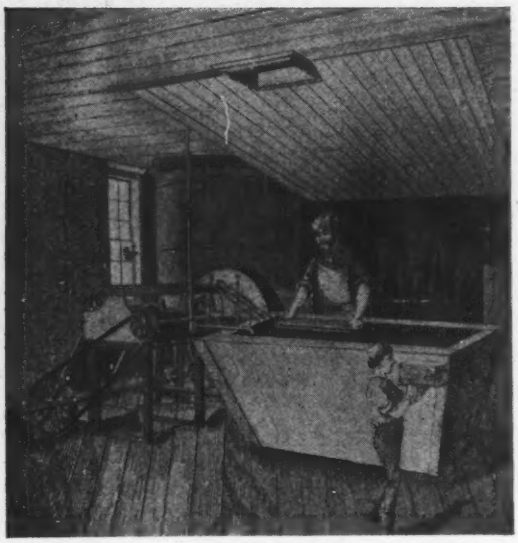
An Old Ream Label

A ream label from the paper mill of Isaac Flagg, Exeter, New Hampshire. This label dates from the beginning of the nineteenth century. The Paper Museum of M. I. T., Cambridge, Massachusetts, is desirous of acquiring early American paper labels, and would be glad to learn of any specimens available.

organized the Collins Paper Company, and built a mill in North Wilbraham, Massachusetts. The Holyoke and the North Wilbraham mills, after twenty-five years or more of successful operation, had the reputation of being the largest makers of fine writing paper in the world.

The Newton Brothers, James H., Moses, Daniel H. and John C., were conspicuous in the paper manufacturing of the Connecticut river valley for half a century. Primarily, they were mill constructors, erecting many buildings for mill companies. But they were also operators of some of the mills that they had erected and equipped, such as the Franklin and Albion. One of their many enterprises was the first mill of the Crocker Manufacturing Company, which was built by them in 1870, and sold the following year to S. S. and D. P. Crocker. The company made a specialty of collar paper, and added to their property by the purchasing of the old Albion mill in 1878. Ultimately, the company became the Crocker-McElwain Company, manufacturers of bond, bristol, envelope and papeterie papers. Moses Newton was superintendent of the Hampden Paper Company, and, in 1877, along with James Ramage and George A. Clarke, organized the Newton Paper Company.

In South Hadley Falls, across the river from Holyoke, the Carew Manufacturing Company built a mill in 1848, the structure being burned and rebuilt in



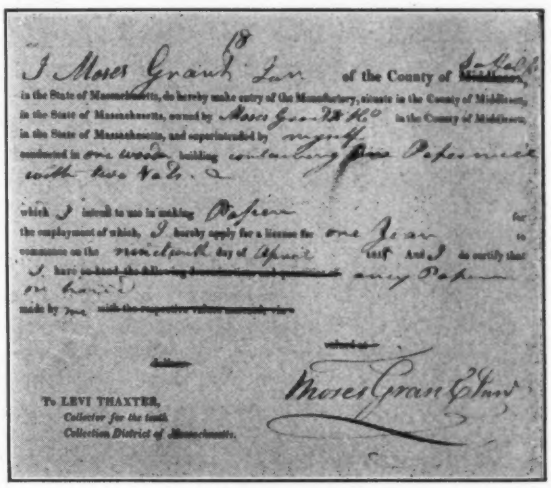
Interior View of Early American Mill for Handmade Paper, Showing Style of Vat and Equipment

1873. Joseph Carew, the treasurer and agent of the company, had his first experience in the South Hadley Falls mill of Howard & Lathrop, the competitors of the celebrated Ameses, early in the nineteenth century. In 1830, he took charge of that mill, remaining until it was burned in 1847. In the following year he organized the Carew Manufacturing Company. Around that time the Carew mill had a capacity of three thousand pounds of fine writing every twenty-four hours. Today, the Carew Manufacturing Company produces at least 24,000 pounds every twenty-four hours of ledger, bond, currency and bank note papers.

In Fitchburg, Massachusetts (original home of the Fitchburg R-R, now the Boston & Maine) paper making began in a single small mill, owned by Leonard Burbank, of the Worcester family of paper makers, after 1801. Little was done, however, until toward the middle of the century, although Alvah Crocker, with whose name paper manufacturing in Fitchburg became conspicuously identified, arrived and bought the Burbank mill in 1823. Crocker was born in Leominster, near Fitchburg, learning the trade in the mill of Nichols & Kendall, and afterward working in a mill in Franklin, New Hampshire. In 1826, he built a mill for himself, the second in Fitchburg. He was then only twenty-five years of age. In 1851, he took Gardner S. Burbank as a partner, and, for many years, the concern operated as Crocker, Burbank & Company, then as a corporation. Today, the Crocker, Burbank & Company Association operates eight mills, all on the Nashua River, two miles above Fitchburg. That the Crockers are still very much in evidence is clear when we note that, today, the concern lists Charles T. Crocker, president; Douglas Crocker, vice-president-treasurer and secretary; Bigelow Crocker, vice-president and assistant treasurer; Charles T. Crocker, 3rd., vice-president and assistant treasurer, and Alvah Crocker, assistant treasurer. These mills are currently turning out approximately 750,000 pounds every twenty-four hours of book, cover, converting, foil mounting, greeting card, school text, bristols, index, and industrial papers.

Another Fitchburg manufacturer of note was Rodney Wallace, who was born in Ipswich, New Hampshire, in 1823, and soon after was established in Fitchburg as a wholesale dealer in books and stationery. In December, 1864, he was associated with Stephen Shipley and Benjamin Snow in buying the Lyon paper mill, beginning business as the West Fitchburg Paper Company. In 1869, he became sole owner of the property, and enlarged the plant by adding two new mills and improved maihinery, so that, a few years later, it had a capacity of thirty thousands pounds a day. Today, the Fitchburg Paper Company, with George R. Wallace as president, produces approximately 210,000 pounds every twenty-four hours of box wrap and lining, gumming, special food packaging, envelope, offset, safety, lithograph, book, special converting, ledger, wall and wet strength papers.

George Bird, another famous paper maker, came from Maine in 1795, and, in 1812, purchased the water rights of the Neponset River, in what afterward became the town of Walpole. There he established the paper manufacturing business that remained in the hands of the Bird family for more than one hundred years. In the second generation, Francis W. Bird was not only a successful paper manufacturer, but was, also, one of the noted men in public life in Massachusetts, in his generation. Charles S. Bird,

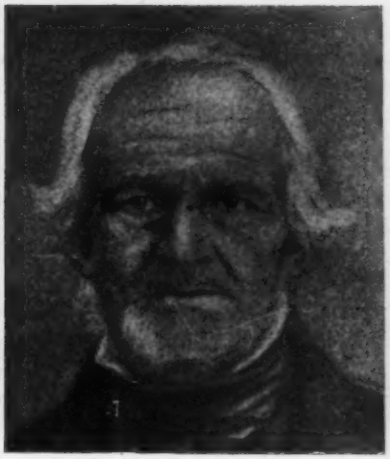

I Moses Grant Jun of the County of
in the State of Massachusetts, do hereby make entry of the Manufactory, situate in the County of Middlesex,
in the State of Massachusetts, owned by Moses Grant & Co in the County of Middlesex,
in the State of Massachusetts, and superintended by myself
conducted in one wooden building containing two Paper mills
with two Vats &c
which I intend to use in making Paper
the employment of which, I hereby apply for a license for one Year to
commence on the twenty first day of April last And I do certify that
I have produced the following documents and papers
made by them with the respective values annexed thereto
To LEVI THAXTER,
Collector for the South
Collection District of Massachusetts.
Moses Grant Jun

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

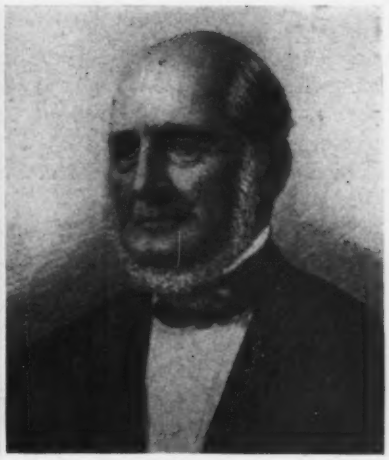
Hand Mill License Two Years Before Fourdriniers

Original application for a license as applied for by Moses Grant for the operation of a two-vat paper mill along the Charles River, Massachusetts. Date is 1815, just two years previous to the introduction of the first paper-machine in America

Daniel Vose—1741-1807 Pioneer, Milton, Massachusetts, Paper Maker Who Was Foremost in the Early Days of the Nation.



George Bird—Started Mill at Milton, Massachusetts, in 1795. Founder of Bird & Sons, One of the Oldest American Firms



Alvah Crocker, Fitchburg, Massachusetts Experimented in Manufacture of Wood Pulp, and Built Turners Falls, Massachusetts, About 1869

Trio of Important Mill Men Before and After the Revolution

who was born in 1855, succeeded his father in ownership and management of the Bird Mills. He improved, developed, and extended the property, until it embraced a box mill in the original home in Walpole, three mills in Norwood, a mill in Phillipsdale, Rhode Island, and two mills in Canada, one in Pont Rouge, Quebec, and the other in Hamilton, Ontario. Today, the mill of Bird & Son, Inc., at East Walpole, produces 500,000 pounds every twenty-four hours of building, sheathing, press board, wall board, chip board, solid fiber, corrugated, cartridge, filter, and special papers of all kinds. The company's Phillipsdale mills produce 250,000 pounds every twenty-four hours of roofing, flooring, lining, insulating and deadening felts; and 150,000 square feet of one-half inch thick wood fiber insulating board.

Connecticut had between forty and fifty mills in the decade 1850-1860. Special interest attached to several of them. In Buckland, in 1825, Joseph Chamberlain had a mill that had been erected by Richard L. Jones forty years before. Henry Champion, Samuel C. Maxon, William Debit and the Goodwins—George, Henry and Edward—were among the owners who followed Chamberlain. In 1868 this mill was sold to Peter Adams, the paper maker who had the distinction of setting up and working the first Fourdrinier in the United States, in Saugerties, New York, in 1827. Adams devoted himself, chiefly, to writing paper, and, at one time, his mill was considered to be one of the largest and best of its kind in the country.

Paper making began in Windsor Locks, Connecticut, about 1836, when Charles Haskell Dexter started to manufacture wrapping in the basement room of an old grist mill, which he owned with Jabez Haskell. Ten years later, he built a mill which became the foundation of the works of C. H. Dexter & Sons, Inc. Today the C. H. Dexter mill produces 20,000 pounds of long fiber paper specialties every twenty-four hours.

Just prior to the civil war, the demand for straw paper was not large, and prices were low. For several years the business was at a rather low ebb. From 1862 to 1870, there was a boom. Paper could not be produced fast enough to supply the demand, and new mills were rushed up in a hurry, while the old ones were enlarged. Prices went up as high as $1.10 per ream of ten pounds. Demand for rye straw was ernormous, and prices ranged from fifteen to thirty dollars a ton.

But the fall was to come. Manufacturing was inflated, prices could not be maintained, and rye straw could no longer be bought cheap. That was the beginning of the end. In the early seventies the production of straw paper was well established in the western States, and it was not long before that section had the monopoly of that kind of paper making. Locations, water power, wages, raw material, markets and facilities, generally, were more favorable in the west than in the east. Small mills in New York gradually gave up the struggle, and, before the end of the century, fully two-thirds of them had been dismantled, or had been turned over to making other kinds of paper.

The Knowltons, who had been in Watertown, New York, from 1824, continued, in this period, to be factors in paper manufacturing in northern New York. Original firm of Knowlton & Rice retired in 1854, but, after a few years of operation by other owners, the sons of the pioneer Knowlton, John C. and George W., Jr., bought the mill in 1861, added other properties, and expanded the business to the extent that it has been known as the Kamargo Mill to this day. First, this mill, like most others, made wrapping, news, book, letter and other varieties, but, in the course of time, it was devoted entirely to writing paper, and, still later, to cover

paper and specialties. Today, the Knowlton Brothers mill in Watertown produce 40,000 pounds of absorbent papers, duplex papers, rag and sulphite colored specialities every twenty-four hours.

B. B. Taggart bought an old mill in Pamelia, within the corporate limits of Watertown, in 1866, and put in machinery for making news and manila. This was the beginning of the Taggart Brothers Company, who, at that time, made rope papers and flour sacks. The concern went extensively into the manufacturing of paper bags. Another mill was built at Felts Mills, and this was occupied by the Taggart Paper Company for making news.

In the prosperity that followed the civil war, and held the country for a decade, paper manufacturing had its share. For four years the civil war was a retardant force, because the southern market for paper was cut off, although selling prices were high, and the cost of raw material increased more proportionately. But change came quickly after peace, improvement was decided, and on a large scale. Old mills were expanded, improved machinery and methods were introduced, and new mills, on a scale heretofore unthought of, were built. Paper commanded high prices, though the demand was shifting—now strong, now weak—but, on the whole, good.

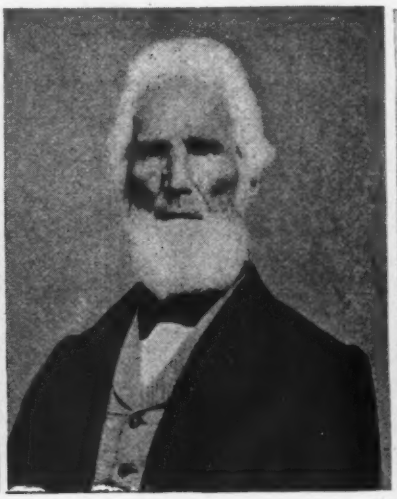
Progression toward larger establishments, business on an extensive scale, and concentration of manufacturing, in certain favorable localities, which had started during the preceding generation, had become a marked feature of the period. New materials, straw, manila and wood, had come in, or were about to come in, to help out the rag situation. Capital was recovering from the financial panics, and was seeking investment. Foreign imports had not increased in proportion to the increase in population and home needs. Transportation facilities, which had already favorably affected the business, were now substantial factors in it.

More than ever before, it was now possible, as well as desirable, to group mills in localities where water power, ready availability of raw material and accessibility to markets, were prime considerations. Already, for these reasons, Berkshire county, in Massachusetts; Hartford county, in Connecticut; Philadelphia, Chester and Delaware counties, in Pennsylvania; and other places, were growing in importance as paper manufacturing centers. Jefferson, Niagara and Columbia counties, in New York; Holyoke, in Massachusetts; the Miami valley, in Ohio; Indiana and Wisconsin, were about to be added to the list of important paper making centers.

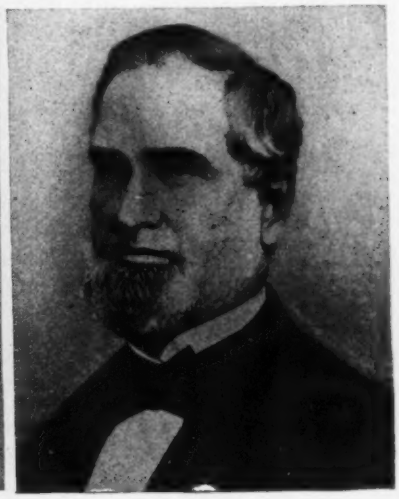
According to the census of 1860, there were five hundred and fifty-five paper mills in twenty-four States. In New England, there were two hundred and four mills; in the middle States, two hundred and seventy-three; in the western States, fifty three; in the southern States, twenty-four; and, in California, one. These mills had a capital of $14,052,683; employed 6,519 males and 4,392 females; and had an annual product of $21,216,802, which was an increase of more than one hundred per cent over the product of 1850.

Of the total 1860 production, amounting to 253,778,240 pounds, printing paper was 131,508,000 pounds, writing 22,268,000 pounds, wrapping 33,379 tons, and lesser quantities of colored, banknote, wall paper, straw board, and other specialties. New England produced to the value of $10,502,069, or nearly one half of the total; and more than was produced in the entire United States in 1850. Massachusetts, alone, reported a value of $6,170,127, as against $7,908,437 for the five middle States. About 65 per cent of the entire amount came from domestic rags, and 12 per cent from cotton waste,

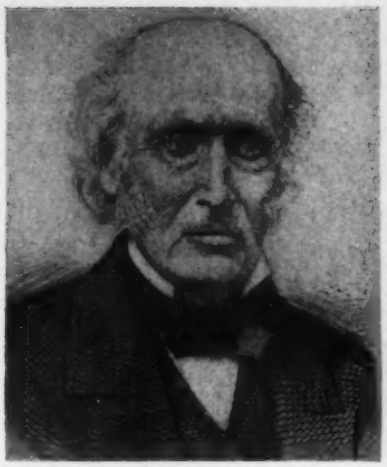
Wells Southworth
Founder of Southworth Manufacturing Company, 1839



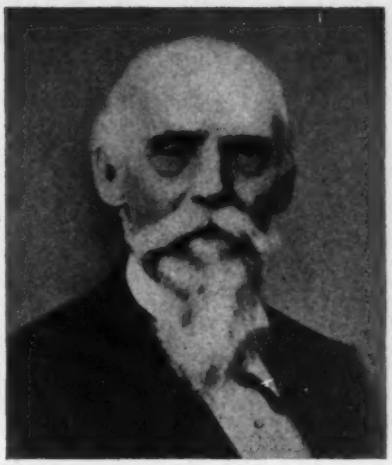
George W. Knowlton
Pioneer paper manufacturer of Watertown, New York. (Started in 1824 in Jefferson County)



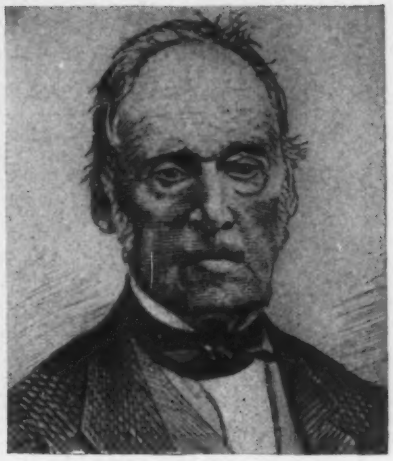
C. H. Dexter
First papermaker of Windsor Locks, Connecticut, About 1836



David Ames
Partner in Ames Brothers Mill
Springfield, Massachusetts, 1820



D. E. Mead
Pioneer Paper Maker in Chillicothe, Ohio, About 1850. Founder of Mead Paper Company in 1881



John Ames
Partner in Ames Brothers Mill, Springfield, Massachusetts, 1820

rope and bagging. Remainder was imported, the value of rags imported for 1860 being $1,540,224. Paper products were greater in quantity than that made either in Great Britain or France, and the consumption greater than the consumption in both those countries combined.

In 1848, the Dayton Paper Mills were started in Ohio by Ellis, Claffin & Company. In 1856, W. A. Weston, J. L. Weston and D. E. Mead, as Weston & Mead, bought the property, which, as time went on, was owned by Mead & Weston, Mead & Nixon, the Mead & Nixon Paper Company, and the Mead Paper Company, Colonel Mead being, in all these years, the dominant spirit in the business, until his death in 1891. Charles D. Mead succeeded his father, and the concern, until after 1900, operated the mills in Dayton, and pulp and paper mills in Chillicothe. For years, the Dayton mill manufactured news, but the later product was book paper. It was one of the first mills in the west to make chemical wood pulp. In 1900, a soda pulp mill was run in connection with the Chillicothe plant. Today, the Mead Corporation, with George H. Mead as chairman of the board, has a daily production capacity of over three million pounds of pulp and paper.

In the years immediately following the civil war, paper manufacturing in Holyoke, Massachusetts, advanced rapidly. Charles O. Chapin and James Kirkham organized the Riverside Paper Company in 1866, and, in the following year, built a mill, which, after 1871, was owned by L. J. Powers and J. H. Appleton. In 1892, a second mill was added to the plant, and, subsequently, a third. The Franklin Paper Company, also organized in 1866, had Calvin Taft as president, and his son-in-law, James H. Newton, as treasurer and agent. It was run on collar paper, but, after paper collars went out of fashion, it made bristol board. Today, the Franklin Paper Company, plant in Holyoke produces about 32,000 pounds, every twenty-four hours, of white ad colored bristols, white and colored index, sample card, post card, duplex bristol, white blanks and p. c. boxboard.

In 1873, Holyoke, twenty years after the first mill was built there, had fifteen mills, operated by fourteen concerns. Daily capacity of these mills was forty-eight and one-half tons. Twenty-five years later, 1897, the "paper city" had twenty-one concerns, operating twenty-six mills, with a daily capacity of three hundred and seventeen tons. In 1873, the fifteen mills had three cylinder machines and sixteen Fourdriniers. In 1897, the twenty-six mills had six cylinders and fifty-three Fourdriniers.

In 1854, there was a rise of two and one-half cents a pound for news. Publishers of newspapers were dismayed, and, as was the case more than sixty years later, in 1916, they complained loudly against the increased price and scarcity. Many of them felt compelled to raise their price, or reduce the size of their papers. New York Herald Tribune reduced to its former size; New York Sun reduced size; Philadelphia Evening Register discontinued publication. At that time, publishers of the New York Times protested that it was costing them sixty thousand dollars a year for paper, and the New York Journal of Commerce was paying from forty to fifty thousand dollars a year.

Naturally, the rise in prices attracted fresh capital into the business. New mills and big mills were built, and the old mills were expanded; for a time, even they were run night and day, a custom that had not before been known. Soon, business was overdone, the market was overstocked, and a feverish competition set in, that sent prices tumbling down below the point of profit. Often, actual loss resulted, and not a few mills were compelled to close. The situation became serious, and various plans were proposed to meet it. Manufacturers of fine writing met in Pittsfield, Massachusetts, in February, 1861, representatives of twenty-one of the thirty-six mills in the country being present. A protective

Eckstein Mill, Manayunk, Pennysylvania, in 1839

association was formed, and it was decided that, for three months from the first of March, production should be curtailed one-third. But the firing upon Fort Sumter, in April, changed everything in the twinkling of an eye. Overnight, prices went up and up, and the mills had plenty to do.

Early in 1862, ordinary printing paper was selling for nine cents a pound. Manufacturers agreed to increase the price, with the result that news went up to seventeen and twenty-two cents a pound before the end of the year. Manufacturers of fine writing took similar action, and raised prices from thirteen and fourteen cents to seventeen cents for fine writing, and from fifteen to twenty-five cents for letter and note paper. Within a few months, all writing papers were forty cents a pound, and No. 1 printing thirty cents. In 1864, news was selling for twenty-eight cents, and fine book for forty-five cents. Presently, news fell off eight cents a pound, and some contracts were made at eighteen cents a pound.

In 1863, William Platner, of Platner & Porter, Unionville, Connecticut, drew up acarefully itemized estimate of the cost of running a mill, to make eighteen hundred pounds of writing a day. Total was $528.26, and, from this, it appeared that the average cost of paper at the mill, at that time, was 29½ cents a pound, while the paper was bringing from forty to fifty cents.

In 1866, fine book paper, which could have been bought before the war for sixteen cents a pound, on six months time, had risen to forty cents, cash. Publishing houses in New York and Boston bought in the European market, because they could save twenty-five per cent.

During the closing years of the last, and the opening years of the present century, there was remarkable expansion in the paper industry. Larger mills were built, bigger and better machinery put into them, and improved methods of manufacture introduced. The industry was established in new places, and, more than ever before, was concentrated in particular localities.

By the perfecting of the wood pulp processes an overwhelming increase in output resulted, and a corresponding demand for paper was developed. Also, wood pulp made possible the multiplying of the kinds of paper, and the manufactures therefrom, to an extent that could not have been imagined a half century before. Pulp making became almost an independent branch of the industry, expanding into a business of great dimensions, serving many lines of manufacture, quite aside from that of purely paper making. Foreign trade began to be a matter for serious consideration. Exports, which, in the past, had been almost negligible, assumed encouraging proportions.

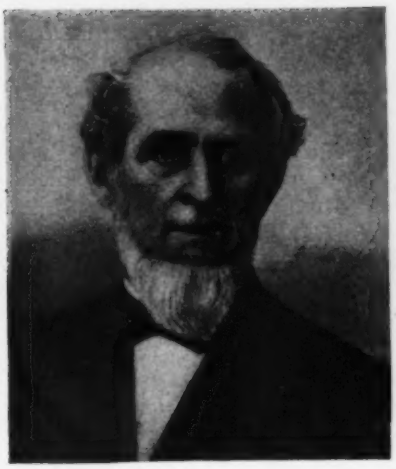
A clear idea of the steady and substantial growth of the industry in the years immediately following the close of the civil war is exhibited in statistics that may be drawn from the various census reports of the United States, from LOCKWOOD'S DIRECTORY and from the PAPER TRADE JOURNAL. In the years between 1860 and 1870, considerable development took place in the value of production, with only a small addition to the number of mills. Six hundred and seventy-seven mills, existing in 1869, with a capital of $34,556,014, employed 17,910 persons to produce about 386,000 tons of paper and paperboard, valued at approximately $48,849,285. The mills were in 31 States and the District of Columbia; New York, Pennsylvania, Massachusetts, and Connecticut still predominating with 432 mills, and $35,861,791 value of production. Ohio came fifth in rank with 44 mills, and an annual production valued at $4,010,483.

During the next ten years the number of establishments increased to seven hundred and forty-two, with

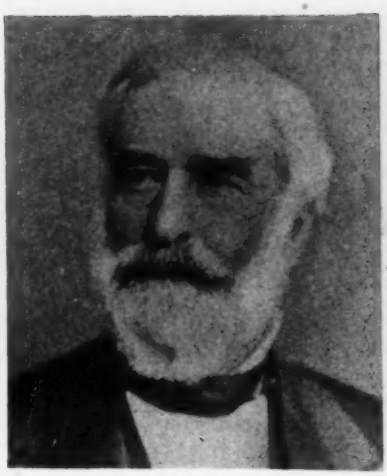
Mr. Prover John Luke
Having served a legal Apprenticeship
to the Art of Paper Making is intitled to
participate in all its advantages,
Dated this 22 day of
Secretary.

(Courtesy of West Virginia Pulp & Paper Company)

Certificate of Paper Making Given to John Luke in 1826 by the English, Irish and Scotch Paper Makers



Joseph C. Parsons
Parsons Paper Company, Holyoke, Massachusetts, 1853



Martin Nixon
Pioneer Soda Pulp Manufacturer in early 1850's

Hugh Burgess
He Patented Chemical Pulping in England in 1852

capital of $48,139,652, number of employees 25,631, and value of product $57,366,860. By 1890, there was a drop in the number of establishments to 649 in 31 States and territories. However, even with fewer mills than in 1870, more capital was invested, more people employed, and the value of production was larger, the figures being; capital, $89,829,540; employees, 31,050; product value, $78,937,184|. This showed not only expansion of the industry generally, but greater expansion in the output of individual establishments.

Statistics in 1900 showed there were 763 establishments in 1899 producing 2,167,593 tons of paper and paperboard with a capital of $167,507,713; number of employees, 49,646; and value of annual product, $127,326,162, an increase of nearly 87 per cent in capital invested, and over 60 per cent in value of annual product since 1889. At the same time, 29 establishments, having capital of $4,326,629, were reported idle. Newsprint in rolls amounted to 569,212 tons, the average cost being $34.62½, and selling price $50 to $60 per ton. Book paper amounted to 304,549 tons, with the average cost at the mill being $69.03 per ton. Fine paper was 131,456 tons, average cost at the mill $135.81.

Foreign trade assumed larger proportions in this period than ever before. We had been importers of paper and allied products, from the colonial and early republic time, the amount and value of such importations showing many fluctuations, year by year, but, generally, on the increase. Rags and paper stock had always been imported, from the time the domestic mills, in their needs, had outgrown domestic supplies in raw materials. Now our imports were keeping up, while our exports were beginning to show more strength.

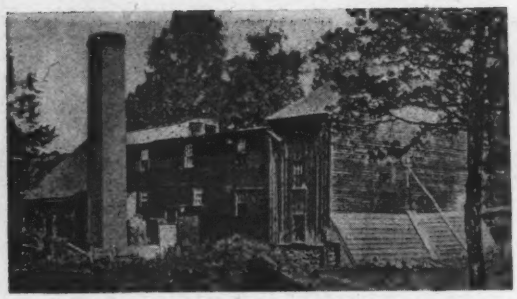
In 1848, we exported to the value of $78,507, while import values were $415,668. In 1852, exports were valued at $119,535, and, in the following year, at $122,212. During the civil war, and for several years after, imports amounted to from one to three million dollars, annually. After a time, cheap news and book paper, which we had been buying from Belgium, ceased to find a market here, with a similar trend in writings, ledger and fancy papers from England and France.

Our heaviest importations, in this later period, were to the value of $1,580,117 in 1871, and, in 1877, $1,200,103. After 1877 imports in several years were to the following values: 1879, $1,186,382; 1880, $1,671,120; 1882, $2,034,289, with slight falling off in the next five years, 1888, $2,400,790; 1893, $3,880,981, with slight falling off in the next six years.

Until after the civil war, United States exports of paper and paperbroad were negligible in quantity and in value, and, in subsequent years, they crawled up very sliwly. Beginning in 1870, and for several years thereafter, values of our exports were as follows: 1870, $514,592; 1879, $1,117,677; 1880, $1,201,143; 1881, $1,408,976; 1884, $929,821; 1885, $972,493; and, in 1890, $1,226,686, of which amount $234,501 was to England, $181,800 to Cuba, $89,540 to Canada, $78,319 to Australia, and $74,640 to Mexico.

By 1915, imports of paper, paperboard and allied products had reached 364,792 tons, valued at $18,954,139; exports in the same year amounted to 111,378 tons valued at $11,751,885. In 1945, imports amounted to 2,753,211 tons, valued at $157,539,995, while exports were 458,689 tons, valued at $89,466,774.

Long before 1900, modern machinery had been the prime factor in the industry, and modern mills, as they were to be for a generation, at least, were established in character. Looking at modern mills, so well equipped with Fourdriniers and cylinders, it is not easy to understand the skepticism as to the efficiency of those machines, and the possibilities inherent in them, that existed for more than half a century after their appearance. Few persons then had dreamed of the increase in



Sunnydale Paper Mill, Birmingham Township, Delaware County, Pennsylvania, as Rebuitl About 1850

size and speed of running that was to come in a generation. In 1847, the machines used in the United States were almost insignificant in size compared with those that were to come after. When the Chelsea mill, in Norwich, Connecticut, put in an 84 inch machine, it was considered a wonder.

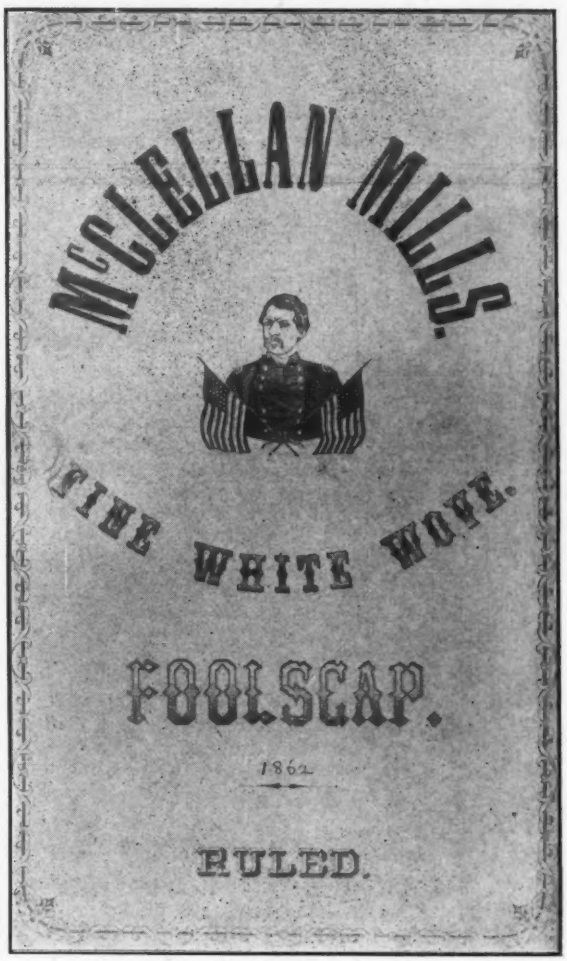
Previous to 1867, the width of the widest machine was not more than one hundred inches, and the maximum speed did not exceed one hundred feet per minute. At that time, it was generally supposed that the limit of width and speed had been reached. Thirteen years later, in 1880 a Fourdrinier was built for the P. H. Glatfelter mill in Spring Grove, Pennsylvania, that had a speed of 200 feet per minute. From that time on, the pace was steadily increased, and, by 1897, there were machines 160 inches wide, capable of making newsprint at 500 feet per minute. In 1897, the largest machine in the world was a Fourdrinier, built by the Rice, Barton & Fales Machine & Iron Company, for the Rumford Falls Paper Company, at Rumford, Maine. Felts for this machine were 172 inches wide, and the width of the paper run was 152 inches.

Even then, most manufacturers were slow in conceding the real value of the great machinery advance. Nevertheless, it took less than 20 years for the American paper manufacterers to confound those doubting Thomases with machines from 150 to 186 inches wide, and a speed of 630 to 650 feet per minute.

In the closing years of the nineteenth century, came the movement toward concentration of capital in all branches of industry, which made that period most notable in the financial and political history of the United States. In the field of paper manufacturing, as well as elsewhere, this tendency became manifest. Capital invested therein increased tremendously, seeking the opportunity afforded by consolidation in corporate form for advantageous employment.

The International Paper Company became the conspicuous success of this consolidation movement. Incorporated in 1898, the company acquired many of the most important mills manufacturing news in the eastern States, and, gradually, added other paper and pulp mills, wood lands and water power to its possessions. With a capital stock of $25,000,000 preferred and $20,000,000 common, and a bonded mortgage of $10,000,000, its assets in 1900-01 were: mill plants, $41,586,964, wood lands and other property, $4,101,723, with these values increasing in subsequent years. Company then owned 34 mill plants, water powers, and wood lands in Maine, New Hampshire, Vermont, Massachusetts, New York, Ontario, and had controlling interests in the Continental Paper Bag Company, the St. Maurice Lumber Company, the American Reality Company, the American Sulphite Company, the Winnipiseogee Lake Cotton and Woolen Company and the Michigan Pulp Wood Company. The organizing president of the company was Alonzo N. Burbank, and the first active president William A. Russell.

During 1946, International Paper Company and its subsidiaries produced a total of 2,671,603 tons of paper, container board and pulp, at a net profit of $31,179,048. Average number of employees, for the year 1946, excluding part-time workers, was 28,422. Total payroll

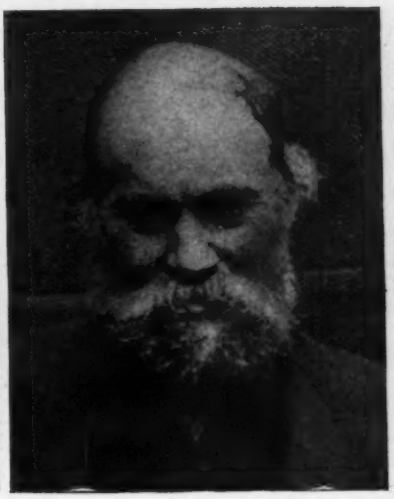


(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

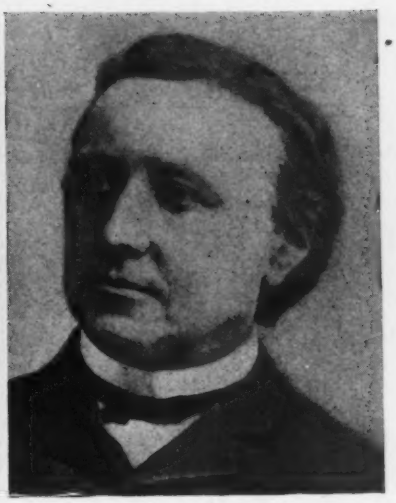
From Civil War Days

After about 1835 the American ream labels became commonplace and lacking in originality. This specimen dates from the 1860 period, and, in comparison with earlier American labels, is extremely uninteresting, and shows the beginning of the machine-age.

B. B. Taggart, Founder of Taggart Brothers Company, Watertown, New York, 1866



Benjamin C. Tilghman—Inventor of Sulphite Pulp Process in 1865



Albrecht Pagenstecher—Pioneered in Ground Wood Pulp at Curtisville, Massachusetts, March, 1867

for the year amounted to $69,443,530. Total sales, and other income, amounted to $295,184,061 in 1946. The Company's Georgetown Mill, South Carolina, *(See pictures, page 247 to 256)* with a daily capacity of 1,350 tons of kraft board for shipping containers, is, today, the largest paper mill in the world. Richard J. Cullen is chairman of the corporation, and John H. Hinman, president.

The American Writing Paper Company was incorporated in New Jersey, with a capital stock of $25,000,000, organized with Elisha Morgan, of Springfield, Massachusette, as president. Down to 1916, when Arthur C. Hastings had been president for several years, the company had done, from the start, an annual business of $12,000,000. Twenty-two mills were then owned and operated, and they had a daily capacity of 828,500 pounds. Control of the corporation changed hands several times, and was organized as the American Writing Paper Corporation in 1937, with the daily capacity of its Holyoke mills put at 429,000 pounds in 1946.

With a capital of $29,000,000 the United Box Board and Paper Company came into existence in 1902, taking over mills operated by 28 companies and firms making straw, news and other boards. That was merely the beginning of a career of difficulties, a disorganization of the ambitious consolidation, receivership proceedings, and, finally, a reorganization in 1912 into the United Paperboard Company, Sidney Mitchell president, with a capital stock of $14,100,000. In 1916, the company owned and operated eleven paperboard mills, with a total capacity of 372 tons, increased to 527 tons in 1921, and to 660,000 tons in 1946.

The Union Bag and Paper Company, now the Union Bag and Paper Corporation, was organized in 1910 to take over the already existing company of the same name, together with the Consolidated S. O. S. Bag Company, the Van Nostwick paper and bag interests, and several paper and pulp mills in New York, altogether 13 plants in New York and Wisconsin. Authorized capital stock was $27,000,000, and the authorized bond issue $5,000,000. In 1916, when the company was incorporated, it was operating in Hudson Falls, New York, and Kaukauna, Wisconsin, ten mills, with daily capacity of 215 tons of paper, 59 tons of groundwood, and 140 tons of sulphite fibre, and bag factories in Hudson Falls, Kaukauna and Chicago; and it controlled a subsidiary company in Canada, the St. Maurice Paper Company.

Today, the Savannah, Georgia, plant of Union Bag & Paper Corporation is the largest and most complete combined pulp and paper mill and bag factory in

American Wood Paper Company, Royersford, Pennsylvania, 1863, Leading Manufacturer of Soda Pulp and Paper

Curtisville Wood-Pulp Mill—First Groundwood Plant in the United States—Stockbridge, Massachusetts, March, 1867

Beckett Mill 1855, Hamilton, Ohio, Was a Small But Progressive Plant.

Original Beckett Mill, 1848, Hamilton, Ohio, Contained First Fourdrinier in That State

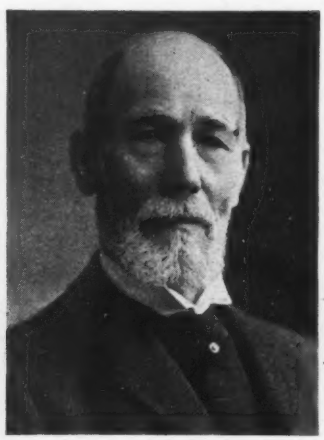
the world. Union Bag & Paper plant can produce 1,000 tons of paper products every day, including 25,000,000 paper bags. To do this, approximately 2,000 men cut and transport wood in southeastern forests, and approximately 4,000 people are directly employed by the company in the plant proper.

Great Northern Paper Company began in 1899 and 1900 with a capital of $4,000,000. Among its founders were Oliver H. Payne, Augustus G. Paine and Garrett Schenck, and was one of the conspicuous successes of its generation. In 1921, Garrett Schenck was president, and the company had three paper mills in Millinocket, East Millinocket and Madison, Maine, with a daily capacity of 1,540 tons of news, wrapper and bag paper, nearly all of it news, and 1,634 tons of groundwood and sulphite pulp. Today, these three mills have a daily capacity of about 3 million pounds of paper, mostly newsprint, and 4 million pounds of pulp.

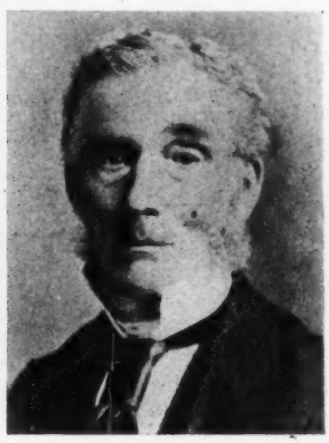
Another notable consolidation of this early period was that of West Virginia Pulp and Paper Company, which, already a large and successful concern, under the presidency of John G. Luke, was reincorporated in 1899, and took in the property of the Morrison & Case Paper Company, in Tyrone, Pennsylvania. In 1921, with members of the Luke family still in full control, the company operated five paper mills in Maryland, Virginia, Pennsylvania and New York, and six pulp mills in the same localities. Daily capacity of the five paper mills was 1,1000 tons of book, lithographic, magazine, writing, label and similar kinds of papers. Daily capacity of the six mills was 460 tons of soda fiber and 440 tons of sulphite fiber. In 1946, Thomas Luke was chairman of the Board, and the combined daily capacity of six company mills totaled 1,410 tons of paper and paperboard.

Other combinations that appeared about this time, with ambition to absorb and control, did not last long. The Columbian Straw Paper Company, with a capital stock of $4,000,000, tried to take in the straw-wrapping mills, but failed. The National Wall Paper Company endured for a few years, and was then absorbed by the Continental Wall Paper Company, which eventually went the way of its predecessors. For some time interest among the pulp board men was centered around the National Wood Board Company, the National Board Company, then the National News Board Company, the Western Box Board Company, and others.

S. D. Warren
Founder of S. D. Warren Company, Cumberland Mills, Maine, Experimented with soda pulp in 1875-1876



William Luke
He came to America from Scotland in 1852, and became associated with the American paper industry. In 1888 he and two sons formed what is known today as the West Virginia Pulp & Paper Company



John Luke
With his father and brother, started the company now known as West Virginia Pulp & Paper Company in 1888

William H. Parsons—Pioneer Paper Manufacturer of West Virginia, About 1890

Senator W. Murray Crane of Crane & Company, Dalton, Massachusetts

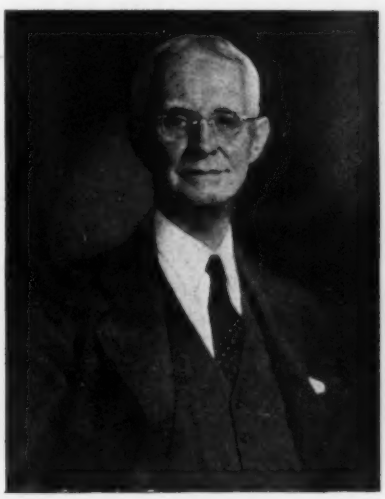
William A. Russell, First Active President of International Paper Company, 1898 to 1899

There is an amazing comparison between the solitary Rittenhouse mill of 1690, worth a few hundred dollars, employing three men, producing annually, perhaps three hundred reams of paper, and supplying only the needs of a small community, and, at the other end of the line, the great business of the twentieth century. The first mills made little else than news, book and writing papers, fullers' press boards and bonnet boards, and in limited quantities. Mills in the United States in 1918 made two hundred and fifty kinds of papers, while the articles manufactured from paper, as their raw material, numbered several hundred. Some several hundred establishments in 1918 represented an investment of close to $600,000; employed over 100,000 persons; afforded business opportunities to thousands of others in the handling of their product; supported hundreds of other industries supplying raw materials and machinery and equipment; had a daily capacity of over 20,000 tons of paper; and annually produced to a value of over $350,000,000.

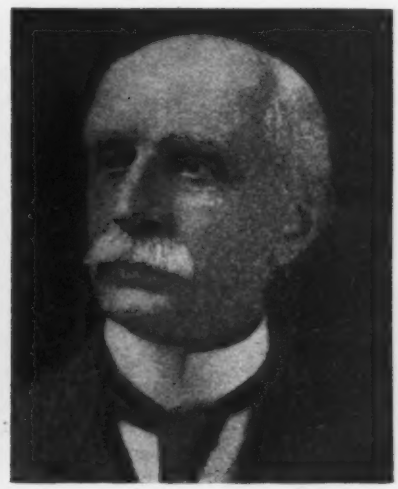
Outstanding Paper Men of the Past Generation Who Set the Fast Pace for This Generation, and Whose Great Influence Is Still Widely Felt in the Industry

These were all exceptional men. Not only as paper manufacturers, but as personalities. Their combined contributions to the paper industry were such that no total may be compounded. In fact, they absolutely initiated and directed so many important improvements for the entire paper world that their lives appeared to be solely dedicated to this business. They were modern pioneers, in the true sense of the word. They were also field marshals, who led their armies of assistants and coworkers to the resulting excellent developments of today.

S. S. Shryock, Sr., of Shryock Brothers, Inc., Philadelphia, Pennsylvania, 1909



Dr. Charles Holmes Herty—1867 to 1938 — Developed Use of Southern Pine for Paper Manufacture



J. A. Kimberly, One of the Founders of Kimberly-Clark Company, Incorporated, 1907.

CHAPTER X

Old American Mills Expand Through the Years

OLD established American paper mills are not numerous, yet there are, indeed, quite a few. Dating back to about the start of the nineteenth century, these mills have come along, year by year, almost automatically, it apears from this distance. Yet no one knows, precisely all the detail and travail of the intervening years. All the ups and downs of mere business experience, all the boms and depressions, wars, peace, economic disturbances, which are even more severe than many wars, they have successfully passed through. So the record of the paper mills that have survived these times, in this country, are not numerous. Perhaps it should be said those remaining are "substantial," and that, really, must be the right word to use, because they have weathered so many furious storms, so many changes of management, in some instances. While, in others, the same families, generation by generation, have served to enlarge, build and rebuild, expand and forever go ahead, no matter what the local and general conditions might be.

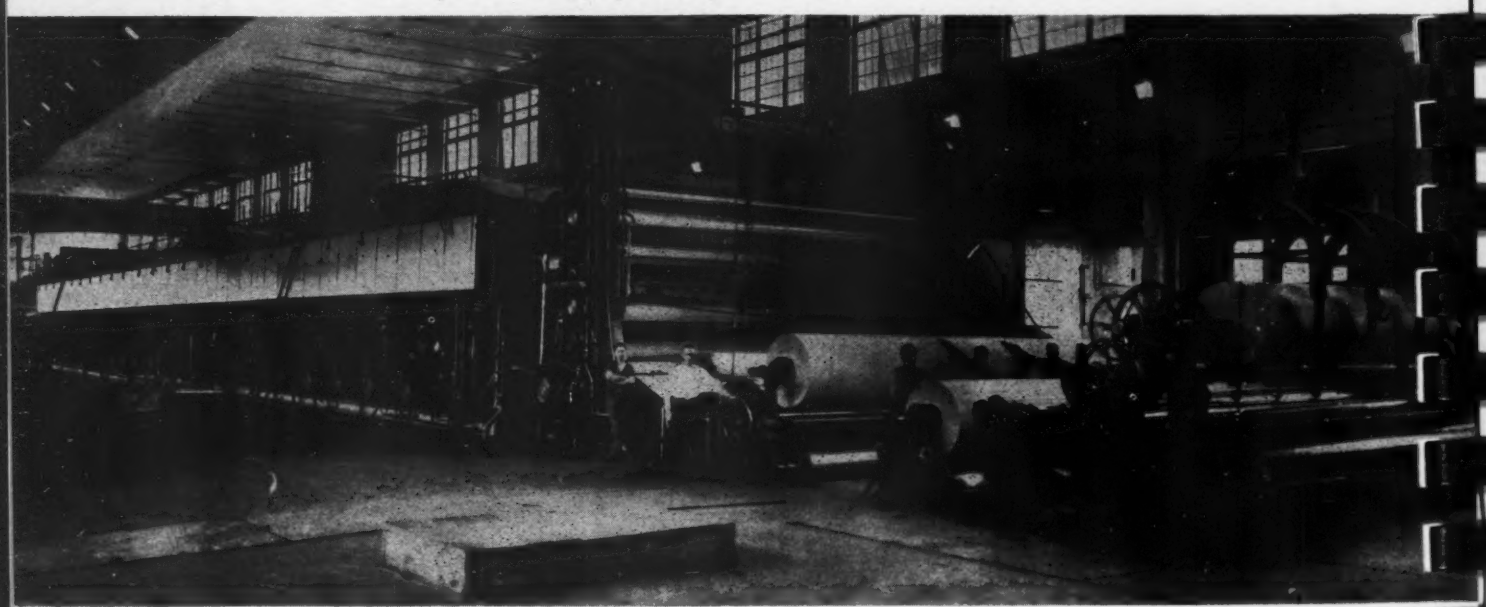
It is to these old institutions ,then, that the PAPER TRADE JOURNAL, in its own 75th year of publication, salutes these firms and these managements. To these mills America has, forsooth, a venerable respect, a real liking, not only because of their age, but, also, because of their hardy tenure in an industry which demands constant improvement, in every department, whehter the concern be great or small. But most of these houses are large, not small. They are American mills of character, famous reputation.

Daniel Mathias Bare, who was born in 1834 and died in 1925, built the first small paper mill on the site of the present D. M. Bare Paper Company in Combined Locks, Wisconsin, in 1865. In spite of repeated misfortunes, due to fires which twice destroyed the mill after its founding, and in spite of the tremendous difficulties that had to be overcome at that time, the firm prospered. There were no railroad facilities until 1871, necessitating hauling by wagon nearly ten miles to the nearest freight station. Mr. Bare not only overcame these obstacles, but, with true pioneer spirit, saw the paper output of his mill increase from one ton to well over thirty tons per day during his life time.

Ownership of the mill remained in the hands of descendents of Mr. Bare until 1946, when their interests were purchased by the Combined Locks Paper Company, Combined Locks, Wisconsin. Under its new ownership, the D. M. Bare Paper Company is now accomplishing marked improvements, and preparing for many others of even greater importance. It looks forward with confidence to a successful and profitable future.

The Beckett Paper Company was established in 1848 at Hamilton, Ohio. It is the oldest industry in Hamilton, and is believed to be the oldest paper mill west of the Allegheny Mountains. Founders were Calvin Reilly, an investor, of Toledo, Ohio, and Adam Laurie, a young paper maker from Glasgow, Scotland. At that time Hamilton was a village of 2,000 population, and

Rolling Out the Paper, from Pulp to Finish, in a Modern American Mill



(Courtesy, International Paper Company)

Alpena Mill (About 1890) First Financially Successful Sulphite Plant in America

Cincinnati, with its 100,000 population was the foremost city of the west. Calvin Reilly came to Hamilton in search of a place for investment. There was no railroad, but the Miami and Erie canal provided transportation, and there was hydraulic power. These facilities had already attracted cotton, woolen, and saw mills, and influenced Mr. Reilly to purchase lands on which the Beckett Paper Company has ever since been located, and contracted for water power.

The situation seemed favorable for paper making. There was an abundance of pure water, and the great market of Cincinnati was at hand. Mr. Reilly knew nothing of the manufacture of paper, but he was able to employ, as his superintendent, Adam Laurie, who also possessed considerable ability. Under the terms of his employment, Mr. Laurie was to supervise the construction of the mill, and operate it, when completed. But, before the work had progressed beyond the foundations, Mr. Reilly failed, and left Mr. Laurie stranded.

In this emergency Adam Laurie turned to William Beckett, a young lawyer who had begun to speculate in Hamilton real estate, particularly in industrial sites with hydraulic power facilities. Mr. Laurie had prepared a prospectus, showing the proposed paper mill could be built complete for $12,000. Daily cost of operation was estimated at $155.63. It was proposed to make 2,000 pounds of printing paper daily, valued at $182.50. On an operating schedule of 280 days a year, an aggregate net profit of $5,027.60 was anticipated, or earnings of $17.92 for each working day. These representations interested William Beckett, and he gave up his law practice for the aper bupsiness and various other promotional activities. The mill was completed at a cost of $12,000, and has been operated on the same site, and under the same family control, for about 100 years.

At the death of William Beckett, his son William, took charge of the mill. It prospered, and the Beckett Paper Company made the paper for the majority of the 122,000,000 McGuffy Readers, printed before 1901. At the outbreak of the Civil War, in 1861, William Beckett entered into a contract with the Cincinnati Commercial Gazette to furnish all the printing paper that newspaper required. This was estimated to represent about one-fourth of the capacity of the mill. At the start of the conflict, the circulation of the Commercial Gazette increased greatly, and, at the same time, the cost of rags doubled and trebled, until rags finally reached a price of nine and one-half cents per pound, which was the exact price paid for the finished paper.

Efforts were made to secure release from the disastrous contract without success, when the resourcefulness of Adam Laurie conceived the plan of de-inking and pulping old newspapers as basic stock. This proved acceptable to the customer, and the Beckett business was kept solvent, The de-inking process used was not perfected as it is today, and sometimes a word or two would appear in the morning newspaper. This led the proprietor of the Commercial Gazette to write to the Beckett mill that he was glad to get the paper, but preferred to do his own printing.

Thomas Beckett, the real founder of the Becketts of today, came into the business in 1876, at the age of sixteen years. He worked in every department of the mill to familiarize himself with the entire business, and resolved to modernize the plant, and to seek wider markets. Gradually, the management passed into his hands, and he proved competent. Before 1890 he had torn down, rebuilt and re-equipped the entire establishment.

One of the important contributions of Thomas Beckett was the creation of Buckeye cover, about the year 1894. Prior to that date S.&S.C. cover, such as was used on every almanac and railroad circular, was the only cover available. Working in cooperation with the late James White, the Chicago paper merchant, Thomas Beckett conceived and developed a line of color antique cover papers of superior strength and appearance. This was one of the earliest cover papers, and has had many imitators. In its enlarged and modernized form Buckeye cover papers continue to form the best known Beckett line.

Until the first world conflict, the Beckett Company made immense quantities of writing and bond papers, largely under the private brands of paper merchants. Changing conditions led to the development of a program of proprietary lines, covering the principal needs of the printing trade. In the order of their development these lines include Buckeye Text, Beckett Cover, Beckett Text, Beckett Offset, Ohio Cover, Tweed Text, Beckett Brilliant White Opaque. In addition, many special greeting and announcement lines are made, together with a variety of envelope and other special papers.

Bird & Son was established in 1795 at Needham, Massachusetts. Since that date four generations of the Bird family have conducted the business. First of these four generations was represented by George Bird, who was born in Union, Maine, and, at an early age, came to Milton Massachusetts. In 1795, he purchased waterpower, and built a paper mill in Needham, That was the starting point of the business of Bird & Son.

George Bird sold his Needlham mill in 1803, and leased a mill in Dedham, Massachusetts. In 1817 he

purchased water power rights and land on the Neponset River, in Walpole, and the business now carried on by Bird & Son has been located on this land since that time.

Francis William Bird, son of George Bird, was born in Dedham, October 22, 1809. April 1, 1834, he purchased the business then owned by his brother, Josiah W. Bird, who had succeeded George Bird. Four years later he acquired the property known as the "Neponset Paper Company," in Walpole, from Jabez Coney, Jr.

He then formed a partnership with his father, George Bird, his brother, Josiah, and his brother-in-law, doing business under the name of George Bird & Son. After the dissolution of this firm, the business was owned and managed by F. W. Bird, under the name of F. W. Bird.

In 1871, Francis W. Bird, Jr., eldest son of Francis W. Bird, came into the business. He died in 1874. Charles Summer Bird, second son of Francis W. Bird, entered the business in 1877. Soon afterwards he was admitted a partner, and the firm name became F. W. Bird & Son.

August 22, 1880, the paper mills were destroyed by fire. They were immediately rebuilt and enlarged.

Francis William Bird died May 22, 1894. The business was then purchased by Charles Sumner Bird, and was carried on by him without partners until January, 1913.

A plant was built in 1904 in the town of Norwood, just over the Walpole line, for the manufacture of roofing and waterproof papers. A year later a mill was built in Hamilton, Ontario, Canada, for the manufacture of roofing papers similar to those made in Norwood, Massachusetts.

The Phillipsdale, Rhode Island mill, where felt paper used in the roofing and floor covering products is manufactured, was built in June, 1907. In November, 1908, a paper mill for the manufacture of felt paper, to be used at the Hamilton mill, was purchased from the Montreal Paper Company, at Pont Rouge, Canada.

In 1911 there was still a further enlargement of the business, when another plant was built in Norwood, adjacent to the roofing plant, for the manufacture of floor covering. January 1, 1913, a partnership was formed by Charles Sumner Bird, Philip R. Allen and Charles Bird, Jr., under the name of Bird & Son. Soon after the declaration of the first World War in 1914, Mr. Bird, Jr., volunteered, and served in the army until the end of the war. November 1, 1917, the plant of the West Coast Roofing Company, located in Chicago, Illinois, was purchased for the manufacture of roofing and waterproof papers.

In April, 1918, Charles S. Bird's elder son, Francis William Bird, came into the business. He died of pneumonia in August, 1918. Francis William Park, in East Walpole, was dedicated to his memory upon completion in 1927.

The firm of Bird & Son was incorporated May 10, 1918, with Charles Sumner Bird as president. He served nine years, until his death October 9, 1927. At his death Philip R. Allen was elected president, holding the office a little over seven years, until January 7, 1935. On that date Mr. Allen retired as president, but retained the office of chairman of the board of directors, Benjamin H. Roberts was elected president, and Charles Sumner Bird, Jr., who had been a member of the board of directors since its incorporation, was elected vice-chairman.

The associated company, Building Products, Ltd., of Canada, has also expanded greatly in the past few years. To the plants at Hamilton and Pont Rouge were added one at Montreal and one at Portneuf, Quebec in 1926, and, in 1934, a new plant was acquired at Winnipeg, Manitoba. Main office of the Canadian firm is at Montreal.

Early in 1935, Bird & Son, Inc., purchased the Berry Asphalt Company of Waterloo, Arkansas. The property includes an asphalt refinery and the lease of nearly forty oil wells.

In every industry there are certain names which, because of long-continued and conspicuous merit, have ceased to be mere means of identification, and have become veritable symbols of quality or outstanding achievement. The paper industry is fortunate in having several of these standard bearers.

Among them is the L. L. Brown Paper Company, of Adams, Massachusetts. For generations, the name of this pioneer firm has been synonymous with exceptionally fine papers. It has been traditionally associated, not only with paper of finest quality, but has even indicated certain very definite kinds and grades. In addition, it has the rather unique distinction of being accepted as a symbol of several very specific qualities as well, chief among which are permanence and durability.

The L. L. Brown Paper Company was established in 1849. Founders were Levi L. Brown and his uncles, Daniel and William Jenks, who formed a partnership known as L. L. Brown & Company. Mill chosen for the new enterprise consisted of a small brick and wooden structure, which occupied part of the site of the present main plant of the company. Daily productive capacity was limited to 1,000 pounds. This parent mill, however, was very carefully and fully eqiupped, according to the standards of the day. As with the present mills of the company, the original plant was geared for the production of quality, exclusively.

The founders had not operated their mill long before they realized that quality talks. Widespread recognition of unusual merit had the inevitable result: much greater facilities were required. The partnership thereupon acquired a large cotton mill nearby, which was at once remodelled for paper manufacturing. But a constantly widening appreciation of L. L. Brown papers made even the increased capacity inadequate. So, in 1871, the original mill, in which L. L. Brown and his associates began operations, was remodelled

and much enlarged. Since then, the mill, and the second unit, now known as the Upper Mill and the Lower Mill, respectively, have been steadily augmented, to keep pace with market requirements and manufacturing progress. Today, these mills are among the most modernly appointed manufacturing plants in the country.

Present name of the company was adopted in 1873, at which time the partnership evolved into a corporation. Levi L. Brown, one of the original founders, became president. T. A. Mole, who joined the company as bookkeeper in 1886, was made treasurer. The corporation continued the basic policy of making quality papers exclusively, the principle on which the business was founded, nearly a century ago. This policy has long since become a tradition, not only with the company, but in the fine paper industry, also.

An illustration of its adherence to standards is found in the raw materials which these mills use. First materials, which the partnership purchased, consisted of white linen and cotton clippings. From that day on, all L. L. Brown permanent papers have been made from none but white rags; not a scrap of colored rags has ever entered an L. L. Brown permanent product. The policy which obtains in the selection of rags characterizes the choice of all other raw materials, also.

While the L. L. Brown Paper Company has always specialized in ledger papers, its products also include other lines, notably linens, bonds, parchments, onion skins, exchange cap, manuscript covers and typewriter papers. Ever since the company was founded, however, chief emphasis has been on record papers, especially those which must endure for unlimited years, or withstand extreme handling.

For many years the L. L. Brown Paper Company had the distinction of being the only mills to manufacture genuine, hand-made paper on a commercial basis. The paper was used for de-luxe editions, engraved and embossed cards, and for other exclusive use. Long after machine-made paper had generally replaced the manually fabricated article, the L. L. Brown Paper Company continued to have calls for the latter. Having always been known as manufacturers of quality papers exclusively, the company continued to be looked to as the source of supply by those who felt that no paper could be genuine quality unless it was hand-made. To care for this demand, the company maintained a department for this purpose, until a few years ago.

While preserving the traditions on which the company was founded, and the spirit of personal craftsmanship which characterized it from the beginning, the L. L. Brown Paper Company has always been among the most progressive in policies and methods. In fact, the L. L. Brown mills form an interesting study in contrasts. There one sees the same conscientious care and thoroughness which formed the nucleus of the enterprise, years ago, flourishing alongside the most modern equipment and methods.

Zenas Crane
Early paper maker of Berkshire County, founded Crane Company at Dalton, Massachusetts, in 1801

Conspicuous among its products is L. L. Brown's linen ledger, a name which, for generations, has signified supreme permanence and durability in record papers. Other grades include Advance Linen Ledger, Forward Linen Ledger, Greylock Linen Ledger, L. L. Brown's Fine, Escort Ledger and Machine Posting, L. L. Brown's Linen, Advance Bond, Forward Bond, Escort Bond.

In addition to the founders, Levi, L. Brown and Daniel and William Jenks, several men prominent in the industry have been associated with the company. Among them were James Osbourn, general superintendent, and E. W. Streeter, assistant superintendent, both of whom served under the administration of Mr. Brown; C. C. Jenks, who succeeded Mr. Brown as president in 1894; and Arthur B. Daniels, president from 1869 to 1938. Mr. Daniels, one of the most highly esteemed figures in the industry had been with the company since 1878. Present officers are: A. Millard Daniels, president and general manager; Arthur B. Daniels, secretary; and Rupert B. Daniels, treasurer.

In the year 1861, A. Wells Case, his twin brother, A. Willard Case, and younger brother, Fred L. Case, started to manufacture album board and binder board under the firm name of Case Brothers, in Highland Park, Manchester, Connecticut. The original mill was destroyed in 1869 by flood. A new mill was built, but was destroyed by fire in 1875.

In 1878, Case Brothers received honors exhibiting their boards at the International Exposition, at Paris, France, and, again in 1889, the firm received the First Order of Merit at the Melbourne International Exposition.

Shortly after the death of A. Wells Case, in 1909, Case Brothers was incorporated by A. Willard Case and Lawrence W. Case, and continued under Case management until 1943, when, at the death of L. W. Case, Carol Case Dennison, daughter of A. Wells Case, took control of the firm. In 1945, Mrs. Dennison was made president, and her two sons, Wells Case Dennison and Robert Case Dennison, upon being released from the army, joined the corporation.

At present, the Dennison interests are working on a new pulping equipment at both the Highland

Park Mill and the Woodland Mill, in East Hartford, Connecticut—a new boiler plant, engines and generating equipment at East Hartford, and, also, the building of specialized experimental machinery under Dennison patents pending.

Case Brothers, Incorporated, is now among the leading manufacturers of genuine pressboard, Jacquard cards and electrical boards in the country.

Zenas Crane rode horseback over the western hills of Massachusetts to find the location for his paper mill in 1801. It is a mill at Milton, reestablished by David Heinman, Benjamin Faneuil, and Thomas Hancock, to which we trace the connection of the Crane family with the art of papermaking, for it was here that Stephen Crane, Jr., learned the business so thoroughly that he later set up for himself at Newton Lower Falls, on the Charles River. And it is reasonable to assume that his brother Zenas, eleven years his junior, could not have lived so near such an interesting and fascinating manufacture without gaining more than a general notion of it, and to have acquired the rudiments of the operations, under his brother's tuition.

Zenas Crane completed his knowledge of papermaking under the exacting, but competent, oversight of General Burbank, in Worcester, and, upon attaining his majority, set out to establish a mill for himself to gratify his independent disposition, and to exercise his skill and business judgment to the full. So, in the Summer of 1799, he rode westward from Worcester on horseback, seeking a place where water would be in abundance for power, pure for the cleaning of rags and the preparation of the fibres; where land was cheap, and the surrounding region would produce a good supply of rags, and promise a market for a considerable portion of his produce.

The place Zenas Crane found was Dalton, in Berkshire County, an agricultural community of about a thousand inhabitants, and here it was, in partnership with John Willard and Henry Wiswell, he purchased a fourteen acre piece of land from Martin Chamberlin for the sum of $194, and established the first paper mill in Massachusetts, west of the Connecticut River, in 1801.

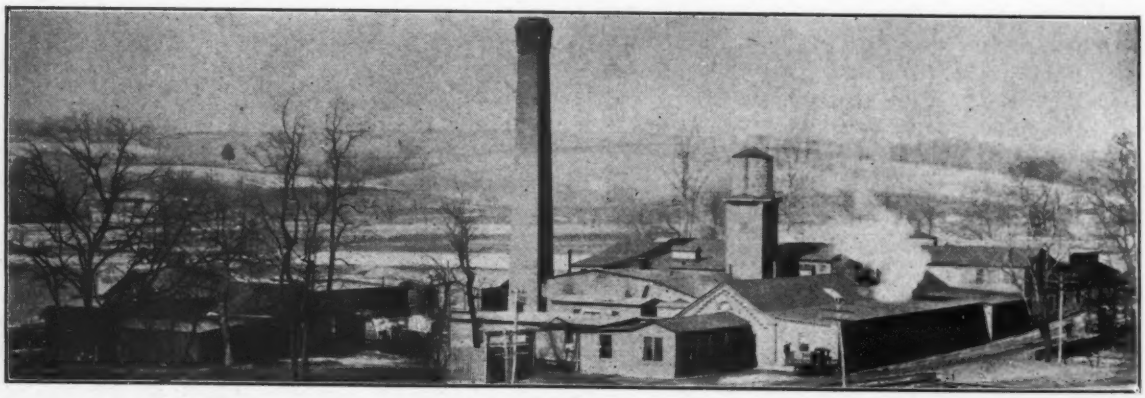
It was on the threshold of this great era that Zenas Crane established the business that still bears his name, is still in his family, and still makes paper from rags (cotton and linen fibres) and from rags alone; still the most enduring, time defying materials from which paper can be made. This continuity of will and purpose, to make only the best of papers that can be made, bridges the stream of history of this company, and links its present modern skills, machines and methods to that first hand-operated, one-vat mill of Zenas Crane's with its daily production of twenty posts (about 120 pounds) of paper.

Personnel of this first mill consisted of an engineer at $3 a week; a vatman and a coucher "at $3.50 per week and board for themselves;" a layboy at sixty cents a week and board; and Mr. Crane, the superintendent and general manager, whose partners allowed him $9 a week. By 1882, Zenas Crane had bought out his partners, as well as another paper mill that had been established in Dalton in 1809, and he became the sole proprietor of the enterprise. He so continued, to his death in 1845, when his two sons, Zenas Marshall and James B. succeeded to his property and business, and carried it on as Crane & Company, by which it is known today, with the fifth generation of the Crane family as actively engaged in making of paper as was the founder of the firm.

The pioneer paper mill, which is known as C. F. Crehore & Son, was established in Newton Lower Falls, Massachusetts, in 1790 by John Ware, a veteran officer of the Continental army. In 1824, William Hurd formed a partnership with Lemuel Crehore, which continued for nine years, during which time they acquired additional property, and had interests on the opposite bank of the river in Needham (now Wellesley).

In 1832, the mills were acquired by Lemuel Crehore, after which Mr. Neal became a partner in the concern. In 1834, Hurd sold to Crehore all his interest in the property on the Newton side of the river. From 1832 to 1919 the mills were entirely owned by the Crehores.

Old Mill of an Old Delaware Concern



(Courtesy, Curtis Paper Company, Newark, Delaware)

(Courtesy, Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin)

Ox Carts Hauled Pulpwood from Nepco Forests, Wisconsin, and from the Upper Michigan Peninsula, Minnesota, and Even from Canada in the Good Old Days

Changes in the firm have been as follows: Hurd & Crehore, 1824; Crehore & Neal, 1834; Lemuel Crehore, 1845; Lemuel Crehore & Son (George C.), 1845; Lemuel Crehore & Co. (C. F. Crehore), 1867; C. F. Crehore, 1868; C. F. Crehore & Son (Fred M.), 1863.

Daily capacity of the mill was one and a half tons of paper. In 1853, the Crehore Mill had four 32″ beating engines, one 62″ Fourdrinier machine on newsprint, and one 36″ cylinder machine on press papers, a high grade product. This product was used by the United States government as their standard for that kind of press board. Mr. Crehore was a very progressive man, and, as rapidly as possible, he supplanted the old processes of hand-work by more modern and efficient methods. First Fourdrinier machine in America was set up and used here, according to the King's History of Newton.

In 1919, after the death of Frederick M. Crehore, the last of the family, the mill was sold to Bernard Early, and, in August, 1920, it was purchased by Adna C. Denison and Llewllyn A. Marr, who formed a partnership and operated the mill under the name of C. F. Crehore & Son, still continuing the manufacture of jacquard board. In February, 1940, Adna C. Denison became sole owner. He sold to Albert Leonard, who is the present owner, and it is now operating under the name of C. F. Crehore & Son Division of the Leonard Company. Since 1940, shoe board, trunk board, and fibrecan board have been manufactured, in addition to jacquard board.

In 1826, Alvah Crocker bought a mill site in West Fitchburg, Massachusetts, and started the business since developed into the present Crocker, Burbank & Company Association.

A fire, which levelled Crocker's best mill in 1842, led to a partnership with Gardner S. Burbank, and, Between 1842 and 1874, they acquired the Snow, Cascade, Upper, Hanna, Whitney, Lyon, and Stone mills. In 1855 Mr. Crocker's son, Charles T. Crocker, came into the firm. The snow mill, taken over in 1862, was built in 1839 by S. S. Crocker, and sold to Benjamin Snow, Jr., in 1847, and he, with Samuel Whitney, turned the mill over to Crocker Burbank after fifteen years of operation. The Cascade mill, bought in 1863, was built about 1842, and first owned by S. S. Wheeler, George Brown and Joel Davis, and, later, by E. P. Tileston, Jonathan Ware and Franklin Wyman, who, in turn, sold out to Crocker Burbank.

The Upper mill, now known as the Brick Mill, built in 1851 by Alvah Crocker and Edwin Upton, came into the Crocker Burbank group in 1859. The Hanna mill, built in 1852 by George and Joseph Brown, passed into the hands of Samuel Hanna, who disposed of it to Crocker Burbank in 1860. The Whitney mill, in Rockville, twice bought by the firm, was built in 1847 by Whitney and Bogart, who sold it to Crocker Burbank, later bought by Samuel Whitney and William Baldwin, Jr., and finally reacquired by Crocker Burbank in 1868. The Lyon mill, built in 1852 by Moses G. and B. F. Lyon, was sold to Crocker Burbank in 1869. The Stone mill, built for S. A. Wheeler and Joel Ames, who jointly owned a half interest, and Alvah Crocker, owning the other half, was acquired by Crocker in 1864, who sold it to the Crocker Burbank firm in 1871.

At the time of Alvah Crocker's death in 1874, these seven mills had a daily output of seventeen tons of paper. Between 1876 and 1909, the company operated as a private partnership, and, among those partners were: Charles T. Crocker, Samuel E. Crocker, George F. Fay, Alvah Crocker, George H. Crocker, Edward S. Crocker and C. T. Crocker, Jr. In 1909, the part-

(Courtesy, Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin)

Seedling Pines of the Nekoosa-Edwards Paper Company's Broad Reforestration Plans, Beginning 20 Years Ago for Pulpwood. Today, Nekoosa Plants More Than Four Million Seedlings Every Year.

nership merged into Crocker, Burbank & Company, Inc.; three years later it became Crocker, Burbank & Company Inc., a Massachusetts corporation, and the Wachusett Realty Trust. C. T. Crocker, Sr., died in 1911. June 30, 1917, Crocker, Burbank and the Trust Company were merged into the present form of Crocker, Burbank & Company Association.

The entire output of Crocker, Burbank & Company Association clears through two sales outlets—Linton Brothers & Company and Crocker Burbank Papers, Inc., both with Fitchburg headquarters. Founded in 1865, Linton Brothers started in Pawtucket with a small converting mill, featuring the production of bristol board. Around the turn of the century, Crocker Burbank commenced producing bristol by a simpler process. In 1912, Norman Harrower joined the Crocker Burbank organization, and, a year later, bought a partnership in the Linton firm. In 1915, when the second Linton brother died, Mr. Harrower, president of the firm, moved it to Fitchburg, and, in 1928, it purchased the office building formerly used by the Parkhill Mill, on Rollstone street. In 1939 Crocker Burbank Papers, Inc., was organized as sales agency for the company's book and converting manufacture, superseding Clark & Company, of New York City.

From its founding in 1826 by Alvah Crocker, the control of the company has been consistently in the hands of Crockers. Crocker Field, in Fitchburg, one of the finest athletic fields in America, was donated by Alvah Crocker, a grandson of the founder.

The first Alvah Crocker was born in North Leominster in 1801, the son of a pioneer paper maker. Alvah was eight years old when he went to work in a paper mill, receiving twenty-five cents for a twelve hour day. In 1820, he left his home in Leominster, and found work in a paper mill in Franklin, New Hampshire, where he remained until 1823, when he secured employment with General Leonard Burbank, said to be the first paper maker in Fitchburg. After three years with the General, young Crocker launched his first independent venture; laboring in his mill by day, and driving his team to Boston at night, with its load of finished printing and writing paper.

At the present time the officers of Crocker, Burbank & Company Association are: Charles T: Crocker, president; Douglas Crocker, vice-president, treasurer and secretary; Bigelow Crocker, vice president and assistant treasurer; Charles T. Crocker III, vice president and assistant treasurer, Alvah Crocker, assistant secretary, Norman Harrower, vice president; Ralph M. Beckwith, vice president.

More than thirteen hundred men and women are employed.

The Crystal Tissue Company was established in 1827, near Middletown, Ohio. From a beginning in 1827, as a water-power saw-mill, to the present modern tissue mill, is a growth that could be found only in a progressive country such as we live in. Because of the abundant water power supplied by the Miami and Erie canal, Adam Dickey, in 1827, started a saw mill on the site now occupied by the Crystal Tissue Company. As the country became more settled, the demand for lumber decreased, and the establishment of farms created a new demand, and the saw mill was converted into a flour mill. Operation of the flour mill continued almost without interruption until 1886, when it was converted into a strawboard paper mill, still using as raw material the product of the local farmers.

First operation of the Crystal mill, as a maker of tissues, came a few years later, when Dr. Thornton, principal of a high school in Cincinnati, Ohio, took charge of the plant, and began the manufacture of light weight papers. This venture was not successful, and the mill was closed for several years, until, in 1894, it was reopened by J. W. Van Dyke, and operated by him as the Crystal Paper Company. In 1894 occurred one of those industrial revolutions that destroy the old and create new ideas, methods and products. This was the introduction of the packaging of foods. Wrapping of crackers and cookies in wax paper created a demand for this type of paper that the Crystal Paper Company, under Van Dyke, filled. Right then began the growth of the Crystal mill to its present place in the tissue, and waxed paper industry.

In 1905, the business had grown to such proportions that an 80-inch machine was added. In 1906 one of the old Cylinder machines was replaced with a 100-inch machine. A 100-inch machine was unheard of in

(Courtesy, Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin)

This Was the Frist Testing Laboratory of the Nekoosa-Edwards Paper Company in the So-Called "Gay" Old Nineties

the manufacture of tissue paper. It was installed and it was made to work. From that day the width of tissue paper machines has increased until today, light weight tissue paper is made 168 inches wide.

The Crystal Paper Company was now operating three machines, a 60, an 80 and a 100-inch. But still this was not enough to take care of the rapidly growing business. The years 1911 and 1912 saw construction of a new mill, and, into this new mill went a 120-inch machine, the widest light weight cylinder tissue paper machine in the world. Again a new use of tissue paper, from which to make paper rugs or carpets for porches, summer homes and the like. Though known as fiber rugs, actually they are made of tissue paper, and much of the paper is made by the Crystal Tissue Company. The paper carpet industry used large rolls of paper 60 inches wide. So, the 120-inch machine would turn out two 60-inch rolls. It took well into 1912 to get the various paper machinery manufacturers to turn out the necessary parts for a 120-inch machine. And again the company went through a very trying experience before the machine actually was satisfactory.

Effect of this development on the costs of crystal products was tremendous. It permitted the company to reach out steadily after business in fields that were previously unable to afford tissue paper. And it permitted Crystal to meet anyone on price in the high quality range of tissues. Crystal has kept constantly after the problems of making better tissue at less cost. For instance, it used to take twelve girls to count the tissue that is put up in ream packages. A ream is 480 sheets. But Crystal was among the first to install a machine which laid out the tissue in the required number of sheets, so that the girls had only to count the units, instead of the single sheets.

Z. W. Ranck organized the present Crystal Tissue

An Outstanding Spot

Twenty-Two Years Ago the Nekoosa-Edwards Paper Company Constructed Its Own Spring Fed Lake, Nepco, With a 13-Mile Shoreline, Supplying the Two Nekoosa Mills with Thirty-Six Million Gallons of ***Water Daily in Place of the Wisconsin River.***

(Courtesy, Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin)

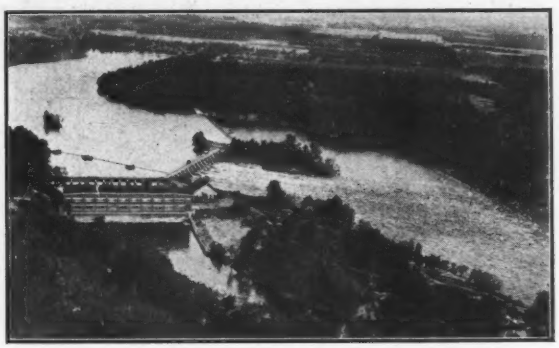
Company July 1, 1920, and took over the active management. Soon after he took charge, the use of waxing paper took a new turn. Manufacturers began using more waxed paper to wrap candy kisses. Special machinery had been invented to do the wrapping. This required a special sheet that would feed through wrapping machines rapidly, and would not tear when it was automatically twisted around the candy kiss.

Technical department of the Crystal Tissue Company, as in many other instances, worked with the manufacturers, and developed a special sheet for this purpose. Another important market for Crystal products was opened, and, to take care of this business, another 120-inch machine was installed, in 1923.

Still wider markets for tissue papers were developed during the years following 1923, necessitating expansion of the equipment of the Crystal mill. To keep ahead of this demand, and to keep the mill up to date, many changes and additions were made. In 1927 a 100-inch Fourdrinier machine was installed, and, in 1930, a 120-inch Fourdrinier. These machines were designated as No. 6 and No. 7, making tissues of all grades.

Additional paper-making machines have meant additional power needs, which have been amplified and improved almost yearly, as more power was needed, using the most modern coal-handling, firing and energy producing equipment. In this same period a water softening plant was installed, and a new bleach house, for the preparation of bleach liquor, was built. In 1931 a new and modern office building was erected.

During this expansion greater markets were being developed, and a need was seen for a complete tissue converting mill. Consequently, in one of the buildings were installed modern high speed printing presses for printing gift wrapping tissues, interfolding machines for toilet papers, and a complete work room for the packaging of thousands of tissue paper items daily. Among these items are tissue rolls for Christmas and everyday gift packaging, manifold bond for printing and train-order tissues. Today, the Crystal mill produces tissue papers in scores of grades and weights, and does the complete job, from the pulp to the finished package, prepared to go to the ultimate consumer.



(Courtesy, Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin)

This is the Centralia Hydro-Electric Plant Which Powers the Nearby Paper Mills

In 1939, Mr. Ranck died, and the group he trained assumed his responsibilities. E. E. Grant became president, L. J. Long, vice-president and general manager, and H. H. Harrison, vice-president in charge of manufacturing.

It is not known just exactly when the site on which the Curtis Paper Company is located was first used for paper mill purposes. We are led to believe that there was a deed, prior to Revolutionary times, from William Penn to a holder of a title, but, during the Revolutionary War, the records were destroyed. First record we are able to find is one of a date in 1789, and, in the description of the property is included "the mill dam." This was a deed to Thomas Meteer, dated March 24, 1789. In Scharf's History of Delaware is the following quotation: "This paper mill was owned in 1804 by John Armstrong, Samuel Meteer & Company, and had probably been bought sometime previous." In 1848, the date which now claimed as the founding date, two Curtis Brothers came down to Newark from Newton Lower Falls, Massachusetts, and bought the mill, and it has been operating under the Curtis name, up to the present time. The Curtis Corporation was formed June 11, 1932, that is, the Curtis Paper Company, a corporation.

The original name was Curtis & Brothers. In 1911, it was changed to Curtis & Brothers, Inc. From 1932 on, Curtis Paper Company was the name. A local history shows that granite papers, which show colored fibres on white stock, were first made at this mill. Although the name of the company was Curtis & Brothers the mill operated, for some years, as the Nonantum Mill, Nonantum being the Indian name for Newton. In 1872, the name of the company was Curtis & Brothers, two original brothers having been George B. Curtis and Solomon Minot Curtis. George left in 1850, and Fred A. Curtis bought his interest, and was the other brother with Solomon Minot Curtis in 1872. The mill was rebuilt in 1887. There were three generations of Curtises who operated the mill. First, George B. and Solomon Minot Curtis, and, a little later, Fred A. Curtis. Then Walter C., Alfred A. and William, and then Alfred's son, Fred Lindsey. The Curtises were with the mill from 1848 to 1926.

William B. Davey came to this country from England in 1816, and, in 1829, purchased a site at Bloomfield, New Jersey, where, in 1842, he founded the business which was to serve those who produce books. Start of the Davey Mill, at Bloomfield, was the prelude to a new era in binders board manufacture. First boards produced at the Davey Mill were made from tarred rope, hemp, yarn, cotton, or linen rags, and were literally hand made; the board being formed by "puddling," a term then in use to denote the formation of the board by a process of manually shaking the wet pulp mixture on a wire screen. Water, draining through, left a layer of pulp, which, when dried and finished, was the first Davey board.

(Courtesy, The Davey Company)

Inspection, Cleaning, Feeding Calendars

Three years after the start of the Bloomfield Mill, W. O. Davey, son of the founder, journeyed to Jersey City, and there established a new, number two Davey Mill, for the manufacture of oakum. This material, in those days, was used mostly for caulking the seams in ships, and stopping leaks.

W. O. Davey, at his mill, turned out its oakum board, and had the idea of developing a board for books, so standardized it would save the printer and binder waste, in both time and defective finished products of their craft.

How often the board, produced in the Bloomfield Mill by his father, had been carried to a printshop or bindery, and put to new tests as new ideas came along in both the printer's mind or the Davey board-making method, no record exists to relate. But the restless desire to improve and perfect was inherent in the son, and his head and hand were busy, over a hundred years ago, with their first service to books.

Davey board arrived at a time when a cover material of its standard qulifications was badly needed, and, in Davey board, the binders of books were to find at hand a structural ally on their side in combatting waste, achieving their best as artists and crafttsmen, and profiting by their skill as business men.

Original mechanical improvements have constantly been made since 1842 in the Davey Mills at Bloomfield, Jersey City, and, later, at Downingtown, Pennsylvania.

Davey pioneering asserted itself in 1871, when a patent was assigned to W. O. Davey & Sons for "bedplate" used to grind up the hard stock.

In 1873, the average binders board machine produced from one to two tons of board a day. In those days, the Davey Mill at Jersey City, equipped with three binders board machines, was producing four tons a day—two machines now produce forty tons a day, in the same mill.

An outstanding enlargement of mechanical process was the accomplishment of the Davey Mill at Jersey City in 1911. Thas year Davey introduced the "wet cylinder" machine of over 100" width, together with the first automatic cutoff, and the first roll table. Up to that time the board had been taken off the making roll by hand.

Pioneering, again, as late as 1939, a binders board table, with many experimental contrivances, was installed. This far sighted step met with complete success, and may well, at some future date, play a revolutionary part in any further development in the art of binders board production.

Edmund H. Davey continued to operate the Davey Mill at Bloomfield, New Jersey, until his death in 1893, after which time the business was incorporated as E. H. Davey Company. He was survived by his daughter, Emeline Davey, whose husband, John M. Van Winkle, carried on the business. He later passed it on to the husband of the daughter of Mrs. Van Winkle, who brought to the business, by her marriage, the abilities of Allison Dodd. In 1916 and 1919, two of Mrs. Dodd's sons, E. Davey Dodd and John A. Dodd, assumed operation of the business. In 1923, the two companies, E. H. Davey Company and W. O. Davey & Sons, came together, forming the company now known as The Davey Company.

At the time of the merger, W. O. Davey & Sons was operated by Leigh H. Davey and W. O. Davey, cousins and grandsons of the founder, William O. Davey. Leigh H. Davey died in 1933.

The Kerr Paper Mill Company, of Downingtown, Pennsylvania, an old established binders board business, joined with The Davey Company in 1928, making the set up of The Davey Company then three mills, one at Downingtown, Pennsylvania, one at Bloomfield, New Jersey, and one at Jersey City, New Jersey. The Bloomfield Mill, operating solely on the production of high grade tar boards and specialties, was abandoned and torn down in June, 1939, because of additional facilities previously added to the other two mills.

(Courtesy, The Davey Company)

Hydraulic press to make sheets more compact. Difference in pressing shown by height of two trucks, before and after.

(Courtesy, The Davey Company)

Calipering, with Final Inspection and Bundling for Shipment

The Davey Jersey City mill produces, largely, the grade of board which is known by the trade as Red Label Davey Board, and which is used principally in the manufacture of books. The Dowington Mill, for years, has manufactured not only the Red Label board, but, also, the other two Davey grades, namely Blue Label, which is a dark colored binders board of a little higher density, and Green Label, which is similar in quality to the old Davey tar board.

In 1853, Rodney Wallace came to Fitchburg, and entered upon his business life. He formed a co-partnership with Stephen Shepley, known as Shepley & Wallace. They were wholesale dealers in books, stationery, paper stock and cotton waste. This firm continued under the name of Shepley & Wallace, and R. Wallace & Company, until July, 1, 1865. On this day the firm dissolved, and the business was divided. Mr. Wallace took the department of paper stock and cotton waste, which is still carried on today.

December 31, 1864, Stephen Shepley, Benjamin Snow and Rodney Wallace purchased the Lyon Paper Mill and the Kimball Scythe Shops, at West Fitchburg, and began the manufacture of paper, under the name of the "Fitchburg Paper Company."

Stephen E. Denton was taken into the firm as a partner soon after. In July, 1865, Rodney Wallace and Benjamin Snow purchased the interest of Stephen Shepley, and the Fitchburg Paper Company was then "Wallace, Snow & Denton." Mr. Denton died in June, 1868. In January, of the following year, Mr. Wallace purchased the interest of Mr. Denton's estate from his widow. He retained the old firm name "Fitchburg Paper Company." His two sons, Herbert I. and George R. Walace, were associated with their father in the management of his business.

Since becoming the sole owner, Mr. Wallace added largely to the original property. A neat village soon sprung up around the mills. He erected a substantial stone dam at great expense, and, in 1878, he built a new brick mill, which we know today as "No. 2 Mill." This new mill was complete with all modern improvements, doubling the capacity of the establishment. Just across the Nashua River is the Fitchburg Railroad, where, to this day, it is used to receive and ship out paper and paper products. During the year 1887, No. 3 Mill was constructed, greatly increasing the facilities for business. This mill was demolished in 1935.

Mr. Wallace died in February, 1903, at the age of eighty. Into the hands of his two sons, Herbert I. and George R., fell the heavy responsibility of carrying on the industry that their father had founded so securely.

Following the death of his father, and the retirement soon after of his brother, Herbert, from active participation in the business, Colonel Wallace was virtually in sole charge, and developed the company into the extensive and important manufacturing unit that it is today.

Detectone Products had its humble origin May 18, 1934, in a small corner of the sample room on the top floor of No. 4 Milstoch house, with John Pallock as its first employee.

It is interesting to note that the new enterprise was launched under the name of "Printone Products." However, a subsequent search, made by a copyright attorney, showed that this trade name was already copyrighted, and it was necessary to drop this name in favor of "Decotone Products."

By July of 1935, it was felt that enough experimental work had been done in the small quarters at No. 4 Mill to warrant moving Decotone to larger quarters. The Rodney Wallace Waste Shop, on Kimball Street, was selected as Decotone's new home, and the purchase and installation of additional aniline printing equipment was started.

The first world war years saw Decotone reach a growth undreamed of, back in the Spring of 1934.

Fitchburg Paper Company held the master order for all ration paper used in the nation during that war.

Decotone's postwar expansion plans called for additional equipment and space, and it was decided to establish plant No. 2 on Willow Street. Growing demand for plastic coated papers and other products will play a leading part in the postwar markets.

The Fitchburg Paper Company has come a long way since Rodney Wallace began manufacturing paper in West Fitchburg. The founding, planning and progress of the industry have all become a tradition that will forever remain a part of the Company, as long as it exists.

The Franklin Paper Company was established and incorporated under the lows of Massachusetts, January 2, 1866. in Worcester, Massachusetts, by Calvin Taft, of that city, James H. Newton, of Holyoke, and E. Newell Taft, of Northbridge. Mill and water rights were secured in Holyoke, and manufacture started on a line of French folios, colored flats and envelope paper. Later, a substantial and novel business was developed in the manufacture of paper for reversible collars, a forerunner to the rubber and celluloid collars.

Up to 1882, changes in the personnel included E. C. Taft, F. H. Chamberlain, E. W. Chapin and John Ramage, serving, at different times, as directors of the

company. Death of Calvin Taft terminated the Taft interests, and James H. Newton became president, with Ed. T. Newton and F. H. Chamberlin later becoming directors.

In 1892, the company was purchased by the present management. The paper machine was changed from Fourdrinier to cylinder, and the production to that of tag boards, silk wrapping and duplex patent coated papers, which gradually changed into the present lines of manufacture; white and colored mill bristols, index, sample card, post card, jewelry card, duplex white blanks and cylinder specialties.

Products of the Franklin Paper Company are distributed by jobbers throughout the United States and Canada. Lines of the company include, Jefferson Index, Beta Index, white and colored Franklin Bristol, National Cream Post Card, Franklin Duplex Bristol, Franklin Inlaid Bristol, Victory Blanks and Franklin Special Blanks. These different grades are used for card indexes, posters, display cards and advertising, menus, photo mounts, sample cards for displaying worsted, woolen and fancy cotton goods, post cards and other items.

One hundred and eighty-two years ago the pioneer iron bloomery west of the Ssuquehanna, was in operation at Spring Forge, Pennsylvania, supplying materials for the Continental Army when the British were in control of the eastern part of the colonies.

The bloomery, under the direction of the old iron master, Daniel Shireman, continued until 1851, when Jacob Hauer bought and converted the forge buildings into a paper mill.

Twelve years later, a few days after President Lincoln passed through Spring Forge, on his way to make his historic address in 1863 at Gettysburg, 20 miles away, P. H. Glatfelter, who had been working in a paper mill in Maryland, bought the property from Mr. Hauer, and established the Spring Forge Mill. Operation was not begun, however, until July, 1864.

Capacity of the mill was 1500 pounds daily, made on one 50 inch machine. In 1874, the mill was moved to its present site, and an 82 inch machine and speedier auxiliary equipment were added, bringing the production to about 8,000 pounds daily.

Product of the early mill was newsprint, made from rye straw. The company owned large box-cars known as "barns," which were sent out over the railroad to pick up the straw and waste from cotton gins.

The mill continued to grow, and, by 1890, had installed the largest and fastest machine in existence, 102 inches. George W. Childs, of the Philadelphia Public Ledger, had pioneered the world's largest Hoe presses, and he founded the mill at what had now become Spring Grove (incorporated 1882) the only one capable of supplying the required 94 inch rolls.

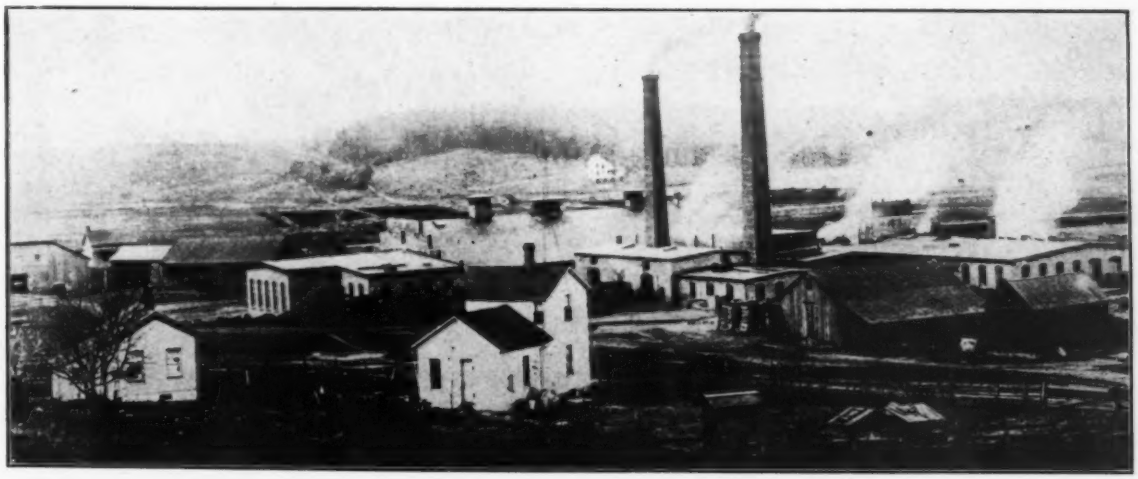
First pulp mill to make pulp from pine, as well as poplar wood by the soda process, was built. Because of this, and with the addition of other equipment in 1895, the product was changed to book papers, bonds, writings, mimeographs, tablet, and lithograph papers, with a daily capacity of 110,000 pounds.

With the completion in 1922 of again the world's largest fine paper machine, 170 inches, the paper capacity became 200,000 pounds per day and 75,000 pounds of pulp. The modernization program, at this time was carried out by the second Glatfelter generation, under the active direction of President W. L. Glatfelter.

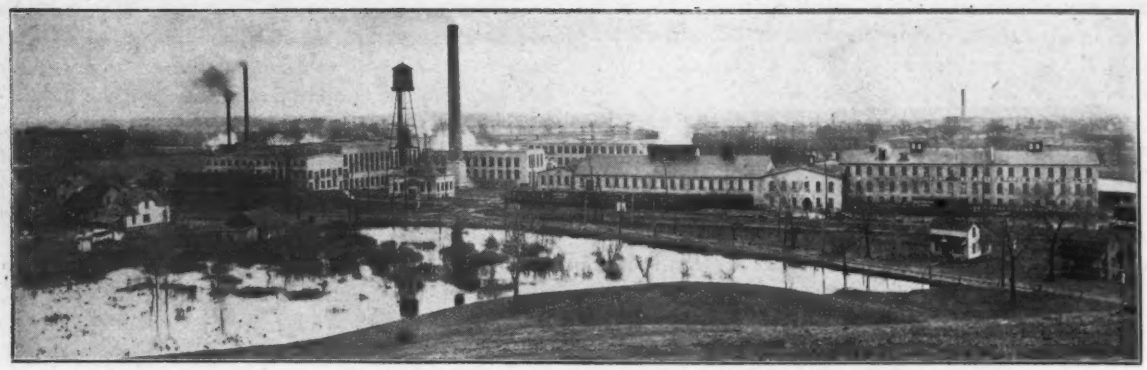
His son, P. H. Glatfelter, began taking active charge in the early twenties, and immediately set up a long range expansion program that was to double the output of the mill, of both pulp and paper. The program entailed an expenditure of some $2,000,000.

On the death of his father, in 1930, P. H. Glatfelter became president. Mr. Glatfelter had launched his ten year modernization program in 1928, beginning with the installation, again, of one of the largest fine paper machines. 190 inches. This increased the productive capacity to 300,000 pounds. Though at times, dur-

Built the Year the Paper Trade Journal Started, 1872



(Courtesy, Kalamazoo Paper Company, Kalamazoo, Michigan)



(Courtesy, Kalamazoo Paper Company, Kalamazoo, Michigan)

After Moving to Present Location of Kalamazoo Paper Company, Kalamazoo, Michigan

ing the depression years, it seemed it might be wise to delay some of the projects, they were confidently carried forward as scheduled.

All obsolete equipment has been replaced; many thousands of feet of floor area have been added to house modern air conditioned finishing and stock rooms, the latest type of pulverized coal burning high pressure boilers, complete new beater rooms, and an entirely remodelled pulp mill, with doubled capacity. The pulp mill carried a $750,000 investment with the old equipment completely replaced.

Of interest is the following data:

	1864
Raw Material	Straw
Product	Newsprint
Daily Capacity	1,500 pounds
Number of machines	One
Widest machine	56″
Number of employees	15
	1947
Raw Material	Chemical Wood Pulp
Product	Book, Writing and Specialties
Daily Capacity	550,000 pounds
Number of machines	Six
Widest machine	190″
Number of employees	640

A $3,000,000 program is now being carried out by the P. H. Glatfelter Company for improving and increasing the output of the plant.

The Hollingsworth & Vose Company was established early in the 19th century at West Groton, Massachusetts, through the purchase and development of a paper mill by Lyman Hollingsworth, a son of Mark Hollingsworth, whose offspring were so instrumental in building up the paper industry of New England. This mill was located at West Groton, Massachusetts, and was acquired in the early nineteenth century. This became the present West Groton plant of the Hollingsworth & Vose Company.

In those days, when the manufacture of paper was a finely skilled handcraft, the rope and jute paper produced by the West Groton Mill of Lyman Hollingsworth was a standard of its time. This consisted principally, of tag and pattern papers, papers for sanding and for various wrapping purposes, and was sold throughout New England, and, even prior to the days of the Civil War, was known and used in foreign markets. Its high reputation the logical successors of the company have held to this day, and the famous strong papers of Hollingsworth & Vose Company, of the present generation, need no introduction to the paper trade of the country.

In 1843 we record a great achievement in paper manufacture in the discovery of the possibilities in manila fibre made by the Hollingsworth brothers, John, Mark, and Lyman. A patent was issued to them by the United States Patent Office in 1843.

In 1871, Zachary T. Hollingsworth, a nephew of the West Groton mill operators, and a son of Amor Hollingsworth, of Tileston & Hollingsworth, in whose mill he learned paper making, purchased the so-called Kennedy mill in East Walpole, Massachusetts, from Francis W. Bird. This mill site was purchased in 1812 by George Bird, a paper maker, who came from Union, Maine, in 1795. He purchased the property from James Richardson, Josiah Daniel, and Eliphalet Baker, subsequently building the dam and paper mill. This was the first paper mill built in Walpole on the Neponset River, the product, at that time, being newspaper.

In 1817, the business was continued by Mr. Bird and his son, Josiah N. Bird, under the firm name of Bird & Son. In 1871, Mr. Bird sold the property to Mr. Hollingsworth. The mill, at that time, contained a 48 inch machine, with an output of about 2,000 pounds a day. September 22, 1873, the mill was destroyed by fire. The owner at once rebuilt it, replacing the old machine with a 62 inch cylinder machine made by Rice, Barton & Fales.

In 1875, Charles Vose entered Mr. Hollingsworth's employ as salesman. Mr. Vose had, since 1867, been employed as salesman by the wholesale paper house of B. H. Thayer & Company, who were the selling agents for Lyman Hollingsworth for his West Groton and Bridgewater mill products. In 1881, Mr. Vose became an equal partner, under the firm name of Hollingsworth & Vose.

Business of the company, having rapidly increased, it was found necessary to increase the output, and, in 1881, the firm purchased from Lyman Hollingsworth his West Groton Mill, making rope manila papers. This contained one 56 inch Fourdrinier machine, with a daily capacity of 6,000 pounds. During the following years the mill changed hands several times, until, in the year 1846, it was burned, before which time it had been re-possessed.

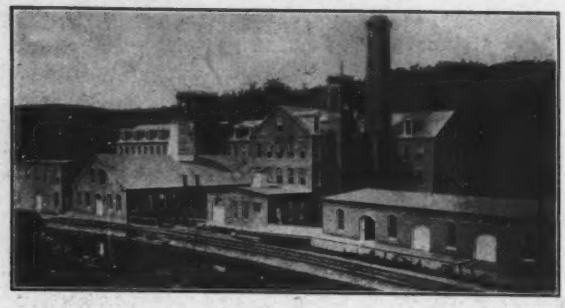
In 1918, Louis E. Vose, a son of Charles Vose, who, in 1898, after leaving college, had come to work in the East Walpole mill, and had been, since 1899, superintendent of that mill, was made manufacturing manager for both mills.

A change in the organization of the company took place, when, in 1921, Z. T. Hollingsworth and Charles Vose, retiring as president and vice-president, respectively, and their sons, Valentine Hollingsworth and Louis E. Vose, taking their places, Robert W. Lennox was elected treasurer and purchasing agent, and Thomas Compton Walsh was made sales manager.

Z. T. Hollingsworth died April 1, 1925. For several years he had practically been in retirement, although continuing to act as chairman of the board of directors. Charles Vose was active, up to the time of his retirement, having, since the company's incorporation, had the managing of sales, as well as the general supervision of manufacturing until the latter duties were taken over by his son in 1918, and continuing in charge of the sales until 1921. Charles Vose died January 15, 1933.

Aerial View of Kalamazoo Paper Company's Plant as It Is Today in Kalamazoo, Michigan

(Courtesy, Kalamazoo Paper Company, Kalamazoo, Michigan)



(Courtesy, Keith Paper Company)

Keith Paper Company Mill at Turner Falls, Massachusetts, About 40 years Ago

In 1929, a new 120-inch three-cylinder machine was installed at the East Walpole mill, to replace the 56 inch cylinder machine, to take care of increased business. It was necessary, in 1935, to add another cylinder to the machine, so that a more diversified line of papers could be manufactured.

Hollingsworth & Whitney Company was established April 5, 1862, at Boston, Massachusetts. Ellis A. Hollingsworth and Leonard Whitney, Jr., formed the partnership of Hollingsworth & Whitney, for the manufacture of paper and paper bags. Mr. Whitney had been operating a paper mill and bag factory at Watertown, and Mr. Hollingsworth had operated a paper mill at South Braintree, Massachusetts.

Ellis A. Hollingsworth was a son of Mark Hollingsworth, who had a paper mill on the Neponset River, below Mattapan, near Boston, as early as 1801. Another son, Lyman Hollingsworth, discovered an improved method for the manufacture of a strong paper by the utilization of waste rope in the manufacturing process. This improved process was mothered by necessity, for Mr. Hollingsworth, being faced with a shortage of stock after the panic of 1837, tried the experiment of cutting the bolt ropes off some old sails lying in the mill yard, and using this material in the manufacture of paper. Result was a fine manila paper of great strength and good quality. The patent for this discovery was granted to John M. Hollingsworth and Lyman Hollingsworth in 1843.

Charles A. Dean became associated with the company in 1874 as sales manager, and, in 1876, a mill was purchased at Gardiner, Maine, which was to be the site of continuous operation from that date until 1939.

April 1, 1882, following the death of both partners, the business was incorporated as Hollingsworth & Whitney Company, with Sumner Hollingsworth as the first president. In that year Charles A. Dean became vice-president and general manager.

Under his management, the growth of Hollingsworth & Whitney Company was outstanding. Tonnage of paper produced increased from 2,705 tons in 1882-1883 to 54,000 tons in 1911, the year of Mr. Dean's retirement, while, in the same period, the capital stock increased from $500,000 to $5,000,000.

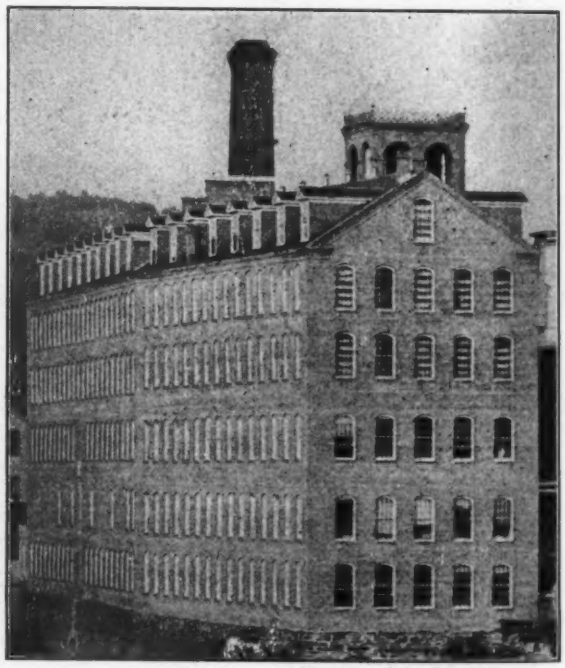
Construction was started on the company's large mills at Winslow, Maine, in 1891. Here were built paper and pulp mills. Capacity of this unit was increased under Mr. Dean's direction and that of his successors, W. E. Pratt and M. L. Madden.

The company's Chickasaw Mills, at Mobile, Alabama, include a pulp mill, pulp-drying machine, bleach plant, Fourdrinier paper machine and cylinder paper machine, and all necessary equipment. The plant is designed to produce approximately 200 tons of sulphate pulp, bleached and unbleached. The paper machine capacity is approximately 160 tons. Balance of the pulp was dried for shipment. Hollingsworth & Whitney Co. produces the pulp required for its mills, and thus rounds out a program of sound expansion. Main office is at Boston, Massachusetts.

Eighty years of paper making will be the record completed this year by the Kalamazoo Paper Company, the pioneer of the industry in the Kalamazoo Valley, Michigan. Company was organized in 1866, and, in September of that year, work began on a dam in Portage Creek, south of Kalamazoo, to provide water power for the new mill.

J. T. Woodbury was the first president of the company, and served in this capacity for eighteen years. After only five years of operation the original wooden mill burned. Work was immediately started on a new modern mill in the same location, with a steam power plant. This was completed in 1872.

The mill enjoyed a steady growth for several years, and, by 1885, was producing 24,000 pounds of book paper a day. At that time the periodical programs of modernization, which have grown to be traditional with the company, included, among other things, the installation of electric lights. At about this same time

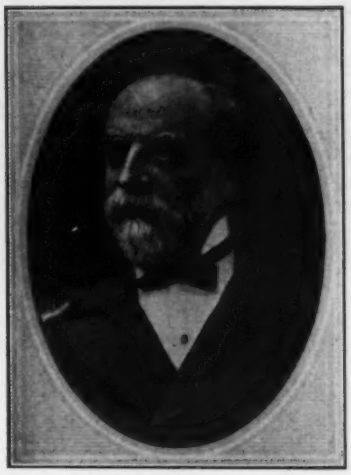


(Courtesy, Keith Paper Company)

Keith Paper Company Mill, Nearly 60 Years Ago

(Courtesy, Keith Paper Company)

John Keith, the founder of Keith Paper Company, Turners Falls, Massachusetts, and the man who always insisted on the very finest quality of paper in his mill.



(Courtesy, Keith Paper Company)

Hon. Alexander H. Rice, Second President of Keith Paper Company, also former Mayor of Boston, former Governor of Massachusetts

(Courtesy, Keith Paper Company)

Albrecht Pagenstecher, one of the 1871 founders and Third President, of the Keith Paper Company, Turner Falls, Massachusetts, and a true pioneer in the paper industry

the company installed the first telephones in the city. This was a private system, connecting the mill with downtown Kalamazoo. After a local exchange was established later, the company retained, for several years, the numbers one and two for its trunk lines.

In 1899, the Kalamazoo Paper Company bought the property of the Wolverine Paper Company, located east of the city on the Kalamazoo River, and the main line of the Michigan Central Railroad. All operations were moved to this new site, where it is located today, and the original property was sold.

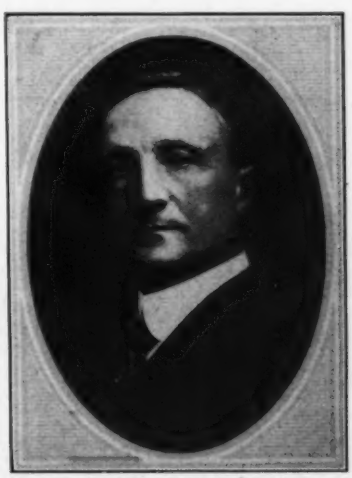
In 1918, the company absorbed by merger the Riverview Coated Paper Company, located on adjoining property. This consolidation gave it the plant that houses its present operations, consisting of three paper mills and two coating mills, with a total capacity of 225 tons a day.

Kalamazoo Paper Company continues, today, as one of several successful producers of book, coated, offset and label papers, with a capable staff headed by George T. Jubb, president; Bert H. Cooper and James A. Wise, vice presidents; and Frederick B. Curtenius, secretary and treasurer. This eighty year old concern is looking confidently to the future, and is vigorously engaged in a program of modernization that is starting with the erection of a complete new central power plant, and will continue through all paper making and handling facilities.

The Keith Paper Company, Turners Falls, Massachusetts, observed its 75th anniversary in August, 1946, having been founded the latter part of 1871 by John Keith, a man of high ideals, whose aim and ambition was to build a mill to manufacture exclusively the highest quality of paper.

He selected Turners Falls as the site for such a mill, as he found every desirable facility available for manufacturing paper, including the important factors of water power and transportation.

The Keith Paper Company has had six presidents as follows: John Keith, 1871 to 1886; and under Mr. Keith's guiding hand the mill was erected and started on its long career. Alexander Hamilton Rice, 1886 to 1895; and Mr. Rice was one of Massachusetts' most distinguished citizens, having served as mayor of Boston, and, later, as Governor of Massachusetts. A. Pagenstecher, 1895 to 1926; and Mr. Pagenstecher was one of the men who helped John Keith found the Keith Paper Company in 1871, and was also a pioneer in the pulp and paper trade. He was well known throughout the papermaking world. Jonathan Bulkley, 1926 to 1939; and Mr. Bulkley served many years as vice-president of Keith, and, in 1926, he became the fourth president of the company. Charles N. Stoddard, January 5, 1939 to June 26, 1939; and the Keith Paper Company was reorganized during 1938, at which time Mr. Stoddard was elected a director, and proved extremely helpful to the board. He was elected president of the company, January 5, 1939, and his sudden death, June 26, 1939, six months



(Courtesy, Keith Paper Company)

Albert R. Smith, former Treasurer and General Manager of Keith Paper Company

later, was a distinct loss to the company. Paul E. Hodgdon, July 28, 1939; and during the reorganization of the company, Mr. Hodgdon was appointed executive vice-president and general manager. Immediately after the death of Mr. Stoddard he was elected president of the company, which office he still retains.

Original mill, under the guidance of John Keith, was equipped with two paper machines, and, in 1872, placed on the market, and became known at once as "Keith's Fine Writings, Bonds and Ledgers" were the highest quality and durability. Later on the mill installed two more paper machines, to take care of the increasing demands for their fine paper.

During the years 1915 to 1920, under the management of Albert R. Smith, who served the company as director, treasurer and general manager for 25 years from 1912 to 1937, the mill was completely electrified and modernized, and a new power plant was installed, thereby insuring for future years the quality and service aimed at by its founder, Mr. Keith. Mr. Smith retired in 1937, after having been with the company 50 years.

In 1938 a re-financing plan included a management agreement with the Deerfield Glassine Company, Monroe Bridge, Massachusetts. For the management Deerfield was given an option on controlling interest. This option was exercised by Deerfield October 21, 1944.

P. E. Hodgdon

President, Treasurer, and General Manager, Keith Paper Company

From the time the Deerfield Glassine Company entered into management agreement, Paul E. Hodgdon has been in charge of production and sales, and now holds the position of president, treasurer and general manager.

During the past eight years, increased production has resulted from a rehabilitation program, which included rearrangement of old equipment, and the purchase of much new equipment. These changes have resulted in greater rag capacity, stock preparation equipment and a new air dryer, also other smaller items, too numerous to mention.

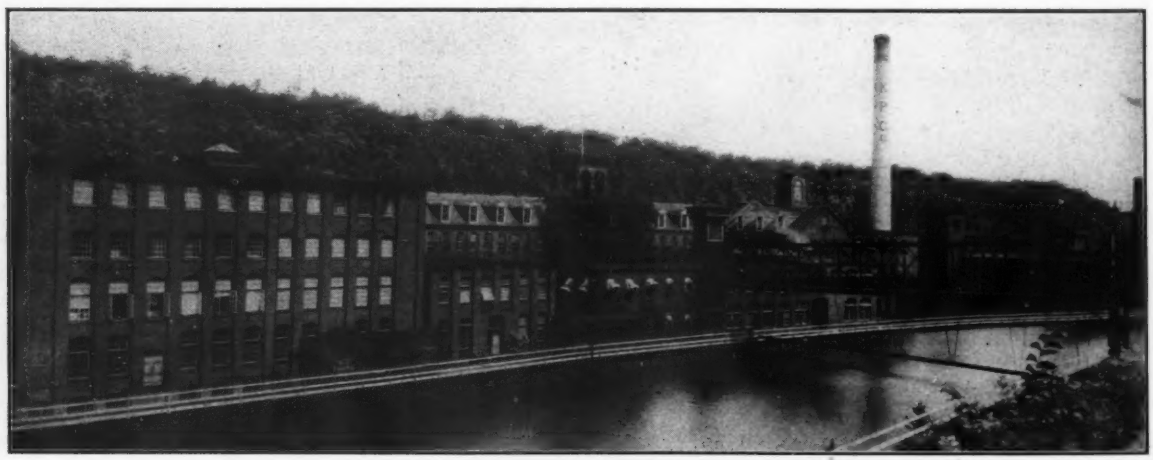
Although Keith is concentrating on higher quality rag papers, several specialties have been developed which have better balanced the production.

All of these changes have made it possible to more than double the production of the mill. Other improvements are scheduled for the future, which, when completed, should very definitely place the mill on a competitive basis.

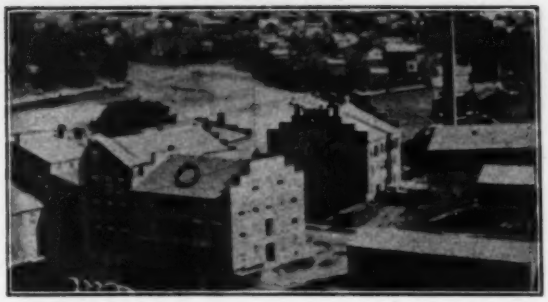
Story of Kimberly-Clark actually began in 1872, when four men formed a partnership to engage in the paper manufacturing business under the name of Kimberly-Clark & Company. The four were J. A. C. Shattuck, and Havilah Babcock. Mr. Babcock was thirty-five. The two were partners in a general

Present Plant of Keith Paper Company, Turners Falls, Massachusetts

Showing Expansion of the Renowned Paper Mills Over the Years Since the Firm Was Founded



(Courtesy, Keith Paper Company)



(Courtesy, Knowlton Brothers, Watertown, New York)

"X" and "O" Mark the Spots
Kamargo Paper Mill of 1808 is designated (by some unknown compiler) as "X". Boiler house and warehouse adjoining comprised entire mill, at the time. Building "O" was a grist mill.

store, later they owned a flour mill. Mr. Clark, twenty-eight, was one partner in a retail hardware business. Mr. Shattuck, thirty-four, had developed a wholesale business, selling to small storekeepers. The four had saved and/or could borrow a total of $30,000—enough, then, for the purpose of starting in the business of making paper. This amount, today, would be sufficient to employ only three persons.

Kimberly-Clark began small—as every new business must—but it grew faster and sounder than most. This growth made it an early and continuing leader in the Fox River Valley. Demand for its products grew, and the company did its best to meet that demand, with the result that employment spread wider and wider. Finally, it reached a stage where future soundness demanded activity outside of Wisconsin, and so, in 1921, company operations spread into New York State and Canada.

Kimberly-Clark was successful from its beginning, and likewise, it had to assume from that beginning the responsibility which always goes with leadership. The company could only be a strong part of the community through continued growth. That meant more and more investment of capital, and, in 1928, the same year in which the last of the original four partners died at the age of ninety, Kimberly-Clark offered stock for sale to the general public. Many shares were bought by employees and others in the community, but much was spread over the United States.

Direct employment, today, at Kimberly-Clark is 6,600 people, compared with approximately 4,000 people who own the company through interest in stock. This is a ratio of approximately one and one-half employees for every one stockholder. It may be interesting to note that, last year, the working force received $16,396,685.00 for its effort, the stockholders received $1,660,429.00 for their investment in mills and equipment—a ratio of about ten to one.

Soon, Kimberly-Clark ownership may be even wider spread, since the Corporation is once more in the midst of a substantial program of expansion and modernization. There is every reason to believe, however, that the tradition started by four men will continue, and that there will always be an ownership type of interest at Kimberly-Clark.

In 1808, a paper mill was founded on the site of the present beater room of Knowlton Brothers, Incorporated,, by a man named Gurdon Caswell, who, a tailor by trade, had emigrated from Utica to the north country. This mill was one of two which was established in that locality, the other being on Sewell's Island, which is currently the site of the Bagley & Sewell Company.

In 1824, two young men from Brattleboro, Vermont, Clark Rice and George W. Knowlton, acquired ownership of the mill, and moved to Watertown to operate it. The firm was then known as Knowlton & Rice. After a fire in 1833, the first machine, a cylinder, was installed, and it is believed this was the first paper machine in northern New York.

Although, in the period of 1854 to 1861, the mill was sold to and operated by two men named Brown and Chamberlain, of Dalton, Massachusetts, George W. Knowlton, Sr., retained a controlling interest in the enterprise. In 1861, his sons, John C. and George W. Jr., took over the active operation of the mill, and the firm was known as Knowlton Brothers. It continued to operate as a partnership until its incorporation in 1892.

In 1869, the mill was completely rebuilt, and modern machinery was installed. As a matter of fact, there are six dryers on the present No. 1 machine, which were put in in 1869, and are still in operation. This Fourdrinier machine trims 58 inches, and, of course, at present, there is very little resemblance to its 1869 ancestor.

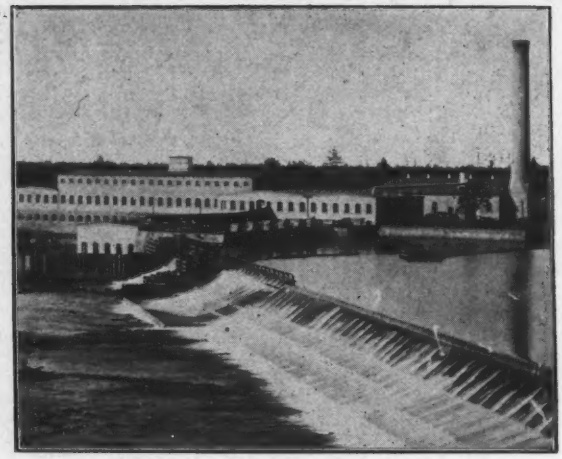
In 1874, the mill began the making of colored papers, whereas previous production had been entirely in fine writings, some newsprint, and book paper.

In 1882, G. Seymour Knowlton came to work in the mill office, and has been with the company ever since, serving now in the capacity of chairman of the board.

Story of the Mead Corporation begins in a small Dayton mill about which little is known, where Daniel

(Courtesy, Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin)

Administrative Offices of the Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin



(Courtesy, Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin)

One of the Two Great Nekoosa Mills Erected in 1893

E. Mead, grandfather of George H. Mead, the present chairman of the board, began working as one of the hired hands.

After 100 continuous years of association with four generations of the Mead family, the company now stands as one of the leading members of America's sixth industry.

Today, the corporation, with a total gross plant value of over $47,000,000, employs more than 6,600 persons in 16 plants, located in eight States.

The company's history actually begins in two places, almost at the same time. Daniel E. Mead, the founder of the company, in association with some other men, formed the firm of Ells, Chaflin & Company in Dayton in 1846. A few months later, in 1847, the first Chillicothe paper mill was started by Entrekin, Green & Company. This mill, on the site of the present Chillicothe plant of the Mead Corporation, was to be acquired by Colonel Mead on December 6, 1890.

Colonel Mead, apparently, was the leading force in the Dayton firm established in 1846, for, a few years later, the name was changed to Weston & Mead, and then to Mead & Weston.

Chillicothe entered the paper making picture in August, 1847, only a year after the Mead family began paper making in Dayton. In that year, Entrekin, Green & Company, built a plant on the South Paint street site of the present Mead mill. It was optrated by a water wheel, turned by water power from a dam on the old Hydraulic Canal.

The Mead family entered the Chillicothe scene in 1890, when Colonel D. E. Mead purchased the entire property from Ingham, Mills & Company. Chillicothe, today, is the center of the widespread Mead Corporation operations. Recognized as the country's No. 1 manufacturer of fine papers, for use in books and magazines, the corporation makes a wide range of different types of paper, noted for their quality.

Among the varied by-products, made in several of the Mead plants, is tanning extract, used in the manufacture of leather. The Mead Corporation is one of the biggest manufacturers of tanning extract in the country. As a by-product of two of its mills, the company sells electric power, and it is also a producer of a chemical substance called lignin, which is extracted from the spent caustic liquor in which the wood chips are cooked. These multiple operations, on a vast scale, contrast sharply with the humble beginning of the industry in Chillicothe.

The soda pulp department of the Mead mill today operates where the old mill was erected, and traces of the first buildings are still surviving.

About the time that the Chillicothe mill was bought by the Meads, it covered about an acre of ground, and employed some 60 persons. Most of the output was newsprint, destined for the Cincinnati papers.

At the death of Colonel Mead November 10, 1891, the business came under the management of his two sons, Harry Eldridge Mead and Charles D. Mead.

Later, in 1905, the operation of the company was turned over to the son of Harry E. Mead, George Houk Mead, who has been most actively interested in its growth ever since. George Mead has been one of the outstanding business men of his generation, not only in Ohio, but in the nation, as a whole, and the success of the corporation, for the last forty years, has been due, in great measure, to his efforts. With him at the helm, and with a body of capable, experienced men as officers, the company has doubled in size several times.

Chronology of the Mead Corporation, 1846-1946: 1846, Colonel Daniel E. Mead becomes a paper manufacturer, and, as a partner helps to found Ells, Chaflin & Company, Dayton, Ohio; 1856, Ells, Chaflin & Company changes its name to Weston & Mead; 1861, Weston & Mead becomes Mead & Weston; 1866, Thomas Nixon (a member of an old paper-making family of Philadelphia) acquires Mr. Weston's interests, and becomes an equal partner in the new firm of Mead & Nixon; 1881, Daniel E. Mead acquires full ownership of Mead & Nixon, and changes corporate name to The Mead Paper Company; 1890, The Mead Paper Company purchases the pulp and paper mills of Ingham Mills & Company, Chillicothe, Ohio, erected in 1847; 1905, The Mead Paper Company is re-organized by George H. Mead, with the name of The Mead Pulp & Paper Company, incorporated in Ohio; 1907, equipment of the original Dayton plant of The Mead Pulp & Paper Company is moved to Chillicothe, Ohio; 1912, Geo. H. Mead is elected president of The Mead Pulp & Paper Company; 1921, The Mead Sales Company is formed to sell, merchandise and advertise the paper, paper-board and pulp produced by Mead and other mills; 1926, The Kingsport Pulp Corporation, Kingsport, Tennessee, becomes the Mead Fibre Company; 1928, The Mead Paperboard Corporation is organized, controlling a number of paperboard mills in Virginia, North Carolina and Tennessee; 1930, The Mead Corporation is formed, embracing fourteen divisions and subsidiaries

for the manufacture of pulp, paper, paperboard, and chestnut extract; 1932, The Mead Corporation assumes management of Philadelphia's Dill & Collins, a mill that traces its early history to 1690, when William Rittenhouse established America's first paper mill; 1934, The Mead Corporation acquires the Wheelwright plant in North Leominster, Massachusetts, where, in 1880, mill bristols were first manufactured in America; 1937, The Brunswick Pulp & Paper Company, Brunswick, Georgia, is organized jointly by the Mead Corporation and Scott Paper Company; 1942, The Mead Corporation acquires the Escanaba Paper Company, Escanaba, Michigan, adding groundwood specialties to its line; 1943, The Mead Corporation acquires the Manistique Pulp and Paper Company, Manistique, Michigan, comprising a groundwood pulp and paper mill; and in 1946, "Paper Makers to America" inaugurates extensive postwar plans.

Miamisburg Paper Company, known originally as the Miami Valley Paper Company, was established in 1871 by Captain Emanuel Shultz, who built the mill at Miamisburg, Ohio, in the heart of the Miami Valley. Construction of the original buildings begun in July 1871, was completed in November of that year, and the first paper came over the machine January 17, 1872. One Fourdrinier had been installed, and it was used for the making of book paper out of rags.

Captain Shultz, a capitalist in his day, had interested his son-in-law, Dr. William H. Manning, in the venture, and he it was who had complete charge of operations when Captain Shultz was elected to Congress about 1880. Dr. Manning retired from business a short time after Captain Shultz returned from Washington, and, soon afterwards, in 1890, the mill was sold to J. H. Friend, president, George H. Friend Paper and Tablet Company, West Carrollton, Ohio.

The original Fourdrinier machine was then used to make newsprint, butcher's manila, and No. 2 manila, and wood pulp was used, thereafter, instead of rags.

The mill, and practically all the equipment, was destroyed by fire in 1893. It was promptly rebuilt, and, this time, a cylinder machine was installed. The principal product marketed was mill wrappers and papers used in the making of containers, such as oyster and berry buckets.

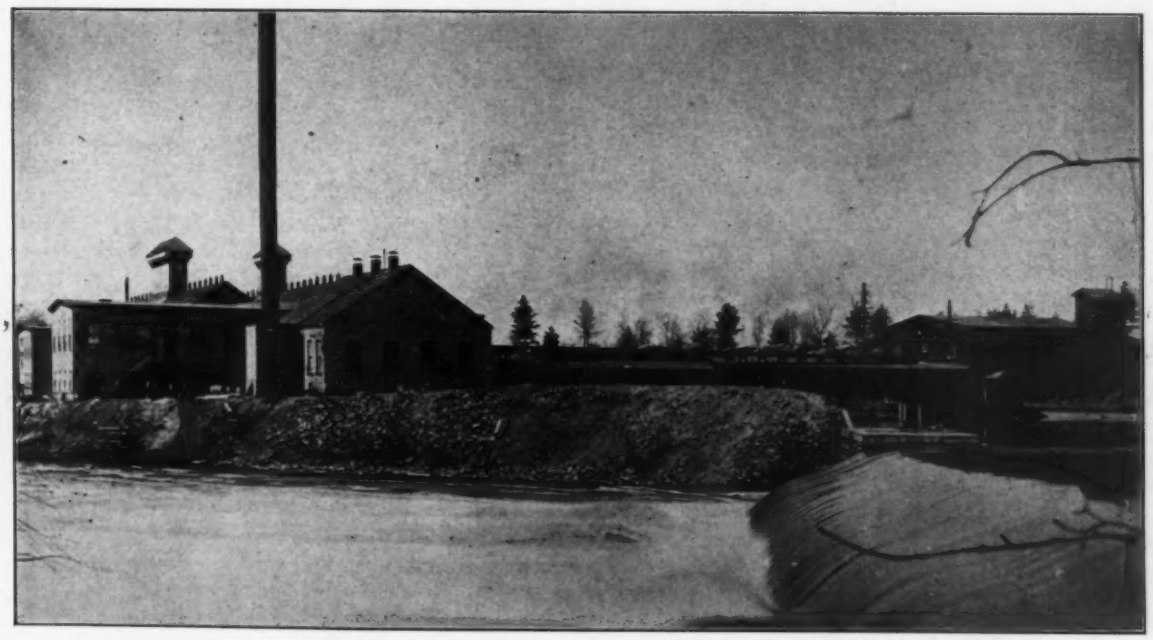
October 24, 1894, the company was incorporated, under the laws of Ohio, as the Miamisburg Paper Company, with J. H. Friend as president and treasurer, and R. W. Burns as vice-president and secretary.

The mill site was then purchased by the Miamisburg Paper Company from the George H. Friend Paper and Tablet Company.

A short time thereafter the cylinder machine was removed, and two Fourdriniers installed. These were used for the making of butcher's manila, No. 2 manila, cash register and detail paper, and colored cover paper. A super-calender was installed.

In 1906, the mill was purchased by the American Envelope Company, of West Carrollton, Ohio. For a while, one machine was used to make manila, cash register paper, and colored news, and the other machine was used in the production of envelope paper. The super-calender was used for the supering of the envelope paper.

First Paper Mill on the Wisconsin River
This Centralia Mill started operations February 1, 1887. This site is now occupied by a most modern hydro-electric plant, furnishing power for Nekoosa's twin paper mills.



(Courtesy, Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin)

(Courtesy, Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin)

This Is the Mill of the Original John Edwards Manufacturing Company, Port Edwards, Wisconsin, in 1887

In 1921, the two machines were abandoned, and a larger machine installed.

The company continued to operate as a subsidiary of the American Envelope Company until January 2, 1940, when it was dissolved as a separate corporation.

Present officers are Carlton W. Smith, president and treasurer; Albert E. Smith, first vice-president and sales manager; Horace C. Tracey, second vice-president; Raymond P. Bertschy, secretary, and Harley L. Werth, assistant secretary.

Story of Nekoosa-Edwards Paper Company begins in 1887, fifteen years after THE PAPER TRADE JOURNAL was founded as a newspaper in 1872. Grover Cleveland had been president of the United States for two years. The period of unrest, which followed the Civil War, had given way to an era of industrial advancement. History was being made in Washington, and the political question of the day was whether or not tariffs on foreign exports should be reduced or abolished.

Out in northern Wisconsin another kind of history was being made in the town of Port Edwards. A great industry was growing, and, where once there had been heard only the din of sawmills, huge grinders were chewing trees into pulp for the paper mills. For, in 1887, the Centralia Pulp & Power Company, original plant of the Nekoosa-Edwards Paper Company, began operations.

Port Edwards had been settled in 1840 by John Edwards, Sr., who, in that year, had erected a sawmill on the Wisconsin river. Successful from the start, the sawmill became one of the largest plants of its kind in the area. In 1859, its management was taken over by John Edwards, Jr., one of the founders of the present Nekoosa-Edwards Paper Company.

In 1890 John Edwards, Jr., and Lewis M. Alexander organized the John Edwards Manufacturing Company. Three years later this company built the area's first complete paper mill at Nekoosa, Wisconsin, a small village adjoining Port Edwards. And, in 1896, they built another mill at Port Edwards. These two mills, together with the Centralia Pulp and Power Company and several lumber companies, with large timber holdings in the State, were consolidated in 1908 under the name of Nekoosa-Edwards Paper Company.

As president, Lewis M. Alexander remained active in the business until his death in 1934, when he was succeeded by his son, John E. Alexander.

Present scope of Nekoosa-Edwards operations is a far cry from the early days, when tiny wood-burning engines slowly dragged in what pulp wood was not driven down the river. Today, Diesel engines, on a privately owned railroad, service the two mills, while a second privately constructed railroad system operates in the extensive Canadian logging operations. Technical contrast with the past is many times greater. From groundwood pulp and coarse papers, Nekoosa-Edwards has progressed to one of the country's leading producers of watermarked sulphite business papers.

Realizing that the final product can be no better than the quality of the ingredients used, Nekoosa-Edwards pioneered in establishing the first commercially practical reforestation program, laying the groundwork for a guaranteed future supply of the basic raw material—pulpwood. From the initial plantings in 1926, the nursery, reforestation, and forest preservation program has now expanded to include almost 500 square miles of company owned or controlled forests, administered by a trained crew of foresters.

Water is another important raw material. To assure itself a never-failing supply of pure water, a spring-fed artificial lake, Nepco, was built near Port Edwards. With a short line of 13 miles, it daily furnishes Nekoosa-Edwards mills with enough pure spring water to supply a city of 300,000 people.

With its sixty years of paper progress, Nekoosa-Edwards salute THE PAPER TRADE JOURNAL on the seventy-fifth anniversary of its founding, with gratitude for the important contributions it has made to the progress and development of the paper industry.

"Paper without size, serving to imbibe wet ink, and thus prevent blots," was Noah Webster's way of defining a product first manufactured in this country in New Haven by Joseph Parker.

This white-bearded businessman established a paper mill that still functions today in the shadow of West Rock. Started in 1840, Joseph Parker & Son Company has been in existence over a century.

When Joseph Parker first began manufacturing, blotting paper was almost unknown. Old-time counting rooms were equipped with sand boxes for taking up wet ink. Clerks held the written sheet of paper in one hand, bending it slightly at the edges to receive the sand, which was sprinkled from a perforated box. After the sand had been tossed lightly over the surface, it was returned to the box for further use.

Parker stumbled, by chance, into the production of blotting paper. In 1856, while at a stationer's warehouse in New York, he saw a case of English blotting paper that had just been imported. Being a novelty, it created great interest. Parker happened to have with him some sample sheets of a special board made for large manufacturing concerns for use in packing their product. Noting the similarity between these sheets and the English paper, he requested that a test be made of the two for their absorbing qualities. This was done on the spot, and his heavy sheets of American-made paper proved the better.

Parker began manufacturing blotting paper, and introduced it to the business world. Within a few years, he had created a large market for his product — a market still vital today.

Through the exhaustive development of the paper industry, the perfection of the matrix, used by newspapers for printing, can be directly credited to Mr. Parker and his associates.

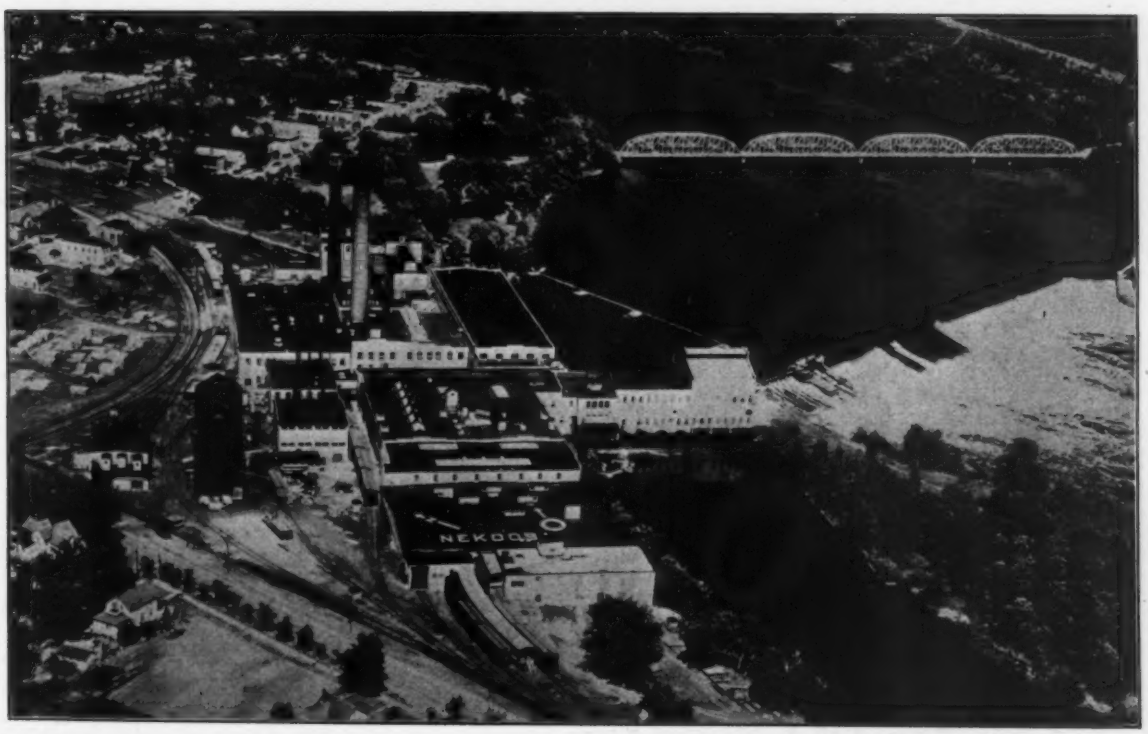
The plant built by Parker, though modernized, still has much of its original equipment, Part of the large Fourdrinier machine, for squeezing and ironing sheets of paper out of pulp, installed in 1856, is still used 24 hours a day. This was the 26th machine of its kind in the United States.

Though Parker died in 1887, at the age of 77, some of his employes are still working at the plant. Oldest of these is S. Frank Chamberlain, treasurer of the company since 1893, who started with the firm in 1872, nearly 69 years ago. He well remembers the early days when Joseph Parker, his white beard bristling, stalked through the plant, supervising the manufacture of America's first blotters.

Parsons Paper Company was founded in 1853 by Joseph C. Parsons, who was, at that time, operating a small paper mill in Suffield, Connecticut. He had been a paper maker for some years before he built the first Holyoke mill. In 1840, he was agent for the Ames Paper Mill, in Northampton, Massachusetts. He left this position in 1843 to take charge of a mill in South Hadley owned by D. and J. Ames. In 1846, this mill was destroyed by fire, and Mr. Parsons bought a hand mill at Suffield, Connecticut, which had two vats, with a capacity of ten reams of writing paper a day. Soon after he acquired this property, he converted it into a machine mill to make one-half ton per day.

Building of the Holyoke dam offered possibilities for cheap power that Mr. Parsons was quick to recognize, and he associated himself with Aaron Bagg, Whiting Street, Broughton Alvord, Cyrus

From the Air the Nekoosa-Edwards Paper Company's Mill (One of Two) Stands Out as a Dominant Factor for the Conversion of Wood Pulp to Paper



(Courtesy, Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin)

Frink, and Chester W. Chapin to build the Parsons Paper Company on the third level canal in 1853. Various kinds of paper were made in this, the first paper mill in Holyoke.

As the business prospered, and the organization grew, the following well-known papermakers became associated with the company: J. S. McElwain, M. C. Pfahler, Edward P. Bagg, Charles R. Randall, Edwin C. Weiser and William McCorkindale. Upon the death of Mr. Parsons, he was succeeded as Agent by J. S. McElwain. Under his administration one of the largest and best equipped mills for the manufacture of bonds, linens and ledgers was erected on the first level canal, Sargeant Street, Holyoke. The capital stock was increased from $60,000, to $360,000.

With the formation of the American Writing Paper Company, the old Parsons Paper Company property, on the third level canal, was sold to them, together with the real estate owned by the Parsons Paper Company, at that time, and the new mill on Sargeant Street was continued.

The Thos. Phillips Company was established in Akron, Ohio, in 1872, when Thomas Phillips came to Akron from Chagrin Falls, Ohio, where he had been working in a paper mill, and started a paper mill on the bank of the Ohio canal. The company was incorporated in 1887. In 1891, the property was destroyed by fire, but was immediately rebuilt.

The company began by making rope paper. Shortly after its founding, the company began the manufacture of paper bags for flour, lime, cement, etc. The company now makes rope paper, composition rope-kraft paper, and kraft paper for bags for flour and other food products, cement and chemicals.

Founder of the company, Thomas Phillips, died a few years after the company was started, and while still a young man. His wife's family, the Howlands, have been active in the management of the ocmpany for many years, most of the time under the management of the late Clarence Howland, and his son, the late Frank C. Howland.

(Courtesy, The Riegel Paper Corporation)

Riegel Paper Corporation's Milford, New Jersey, Mill Is a Leading Producer of Glassine and Greaseproof Papers, Used Widely as Liners for Cereal and Other Packages, and as Wrappers for a Number of Well Known Branded Products

(Courtesy, The Riegel Paper Corporation)

Oldest Riegel Paper Mill

The Riegelsville, New Jersey, Mill of Riegel Paper Corporation is the Oldest of the Company's Four Mills. Located on the Banks of the Delaware River, the Mill Produces Specialty Papers, Like Cable Stock, Cover Cap, 20th Century Bristol, and Others.

Riegel Paper Corporation, now in its 75th year, was incorporated in New Jersey March 11, 1873. John Leidy Riegel, grandfather of John Lawrence Riegel, who is now president of the company, had entered the paper business in 1862, when he converted a grist mill at Finesville, New Jersey, into a paper mill. As the business grew, new plants were built nearby at Riegelsville, Warren Glen, Hughesville and Milford, all in New Jersey.

The old Finesville mill made newsprint from rags. As the industry progressed, Riegel was a pioneer in the development of papers made from combinations of jute fibre and woodpulp.

Soon after the turn of the century, the company saw the long term possibilities of glassine and greaseproof papers, and converted the Milford mill to their production. Glassines and greaseproofs have been improved, and an ever widening field has been found for their unique qualities. Today, they rank at the top as protective packaging materials.

Riegel is a leader in its own specialized fields. It is the largest producer of glassine and greaseproof papers. While these are the company's principal products, it also "tailor makes" many kinds of industrial specialty papers to exacting specifications. It has become a matter of course for paper users to turn to Riegel for the development and manufacture of some new or unique paper for special purposes.

The company's growth, from a few employees in the Fineville mill, to 1,700 men and women in steady employment under good working conditions, is the result of a willingness on the part of management and employees to work together in improving old products and developing new ones.

The Milford mill is the largest of the company's four operations. It has eight paper machines. Six of these are Fourdrinier machines, for the production of glassine and greaseproof papers and cereal liner. Another Fourdrinier machine will be in operation, early in 1948. The two Yankee machines at Milford operate,

principally, on waxing paper base stock. The Milford mill has a converting department and a coating department for further processing of glassine, greaseproof and other papers.

The Warren mill has two cylinder machines, and manufactures jute tag, tuftwite tag, Jersey bristol, beaming paper, wallet, patch stock, and similar grades. In Hughesville, a combination cylinder and Fourdrinier machine produces, among other papers, film wrapper, X-ray interleaving paper, addressing machine stock, jute, tympan paper, and calendar roll paper. Riegelsville mill has one cylinder machine, which makes, primarily, cable paper, 20th century bristol and mill wrapper. Together, the Riegel line includes hundreds of different papers.

Riegel papers are used for cereal liners, cracker and biscuit box liners, candy wrappers, packaging of tobacco products, soaps, and many other food and household items. Among those served by Riegel in the wide field of specialty papers are the photographic and electrical industries. The company also distributes, through merchants and jobbers, substantial amounts of its products, particularly its printing lines, such as jute tag and Jersey bristol.

The Robertson Paper Box Company, Incorporated, traces its history to the wooden Rockland paper mill, built in 1850 by John W. Smith, and the Montville Paper Company, started in 1859. Carmichael Robertson bought the latter in 1863, and the former in 1873, and added the Bank mill, built in 1886, operating the three plants under his name.

On his death in 1888, the business was carried on by his sons, Alexander, Tyron and William, as the C. M. Robertson estate, manufacturing manila paper from rope, writing, anti-rust and wall papers.

In 1895, the Rex Paper Box Company built a frame factory adjoining the Rockland mill, to make paper boxes. This was acquired by the estate in 1897, making its entry into the folding box business—today its principal product.

A stone mill now replaces the Rockland mill, and a modern brick factory replaces the old box factory. The other two mills have been disposed of.

The company was incorporated in 1908 as the C. M. Robertson Company. This name was changed to Robertson Paper Company in 1916. In 1927, the name of Robertson Paper Box Company, Inc., was adopted.

The paper mill manufactures all grades of boxboards in calipers from .012 to .040. Grades consist of white patent coated news, double white patent coated news, double white patent coated, manila chip, and colored box boards. Practically the entire production of box-

Aerial View of the Modern Paper Mill of the Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin

(Courtesy, Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin)

(Courtesy, The Rogers Paper Manufacturing Company)

Print of Old Mill of the Rogers Paper Manufacturing Company, Established in 1832

board is converted into folding boxes in the box factory, where a very wide variety of folding boxes are made. Production of the box factory is entirely a "made to order" product. Most of the boxes are printed in multi colors, for consumption by makers of blankets, wearing apparel, footwear, hosiery, hardware, candy, cigars, and cigarettes, soaps and soap powders, cosmetics, facial tissues, wax paper, and medicines.

Rogers Corporation was 40 years old when THE PAPER TRADE JOURNAL was established in 1872. At that time, however, it was known as The Rogers Paper Manufacturing Company. The change in name occurred in 1945.

Seventy-five years ago Rogers holdings consisted of a group of mills in Manchester, Connecticut. These facilities were expanded in 1935, when the company acquired a large group of mills at Goodyear, Connecticut. Rogers still maintains its headquarters, including sales and executive offices, in Manchester.

Rogers has been in continuous operation since 1832. In July, 1927, the business was purchased from the third generation of its original founders.

For the larger part of its history, Rogers has specialized in the manufacture of high strength pressboard. This specialization in structural paper was continued. Rogers became a large supplier of fibrous materials, particularly adapted to the insulation requirements of the electric, radio and electronic industries.

For more than ten years Rogers has been engaged in an intensive program of research and development. This program led to further diversification of the company's products and their uses. In addition to manufacturing high strength materials out of cellulose, Rogers became firmly established in the plastics field. Research and development program also established the company in the shoe field. Several materials, in which synthetic and/or natural rubber are blended with cellulose fibres, were developed for shoe midsoles, Dutchmen and counters.

Rogers also broadened its activities to include a division to handle fabrication of fibrous materials. The fabricating division is complete, with tool and die-making facilities, as well as stamping, drawing and forming equipment.

The Shyrock Brothers business had its inception in 1790, when John Shyrock founded the Hollywell Mill, in Chambersburg, Pennsylvania, to make printing and wrapping papers, and later, to make banknote paper, once extensively bought and used by the United States Government.

In the late eighteen twenties, William Magaw interested George A. Shyrock in the principle of adapting his patented strawpulp process to the practical manufacture of paper, and, in 1829, the Hollywell Mill commenced experimenting with the method, and it is said of George Shyrock that he made paper of every description from wheat, rye, barley, oats and buckwheat straws; from corn blades; a wide variety of grasses; corn husks; white pine shavings; willow wood; refuse tan. He bleached straw to produce a printing paper, but, with rags at from two and one half to four and one-half cents a pound, it did not pay to bleach straw.

Early records of the Hollywell Mill show that, once George Shryock had it in satisfactory operation, he boiled up as much as one thousand tons of straw at a time, and produced up to thirty reams of paper a day. When the trial period was successfully passed, Shryock completely eliminated all manufacture from rag in the Chambersburg mill, in favor of the use of strawpulp. A small cylinder machine was installed, which George Shryock claimed to be the first of its kind to operate on that material. Later, he invented the groved wood roll for the production of binders

boards and box boards. The expanding output led to the construction of a new mill dam, a new drying house, and additions to the original building. Four pulp engines were installed, and a new steam house, with tubs, added.

George Shryock and Nicholas G. Ridgley acquired the exclusive rights to the Magaw patent for the eastern part of the country, and, when Nicholas Ridgley died in 1831, the firm of G. A. Shryock & Company was organized by George Shryock, S. D. Culbertson, Reade Washington, and Alexander Calhoun. The new company built the "Mammoth" mill on the Conococheague creek, near Chambersburg, with one hundred and two miles of drying poles, seventeen large dry presses, eight pulp engines, and eight machines, with which an output of one hundred pounds an hour was achieved.

Chambersburg mill was burned in 1864, during the Civil War sacking of Chambersburg, but, at the close of the conflict, George Shryock and his brother, John, started the Papyrus Mills at Shippensburg, Pennsylvania, to manufacture wrappings and boards. George Shryock ran the mill and John opened an office in Philadelphia to market the output.

Lightning destroyed the Shippensburg mill in 1898, and, shortly thereafter, Samuel S. Shryock purchased the Dorlan Mills in Downingtown, and began the manufacture of binders boards.

The business was incorporated in 1909 by Samuel S. Shryock, Sr., Samuel S. Shryock, Jr., Owen A. Shryock and Clarence C. Dorsey. Samuel Shryock, Sr., died in 1926, at the age of eighty-six.

Taggart Corporation, now a subsidiary of the St. Regis Paper Company, New York, started operations in Watertown, New York, in 1866. Original Taggart organization, known as Taggarts and Davis' Paper Mills, built its first mill in Watertown on the site of the present-day mill. Taggart Brothers Company, as it later became known, was incorporated in 1886, and was engaged almost exclusively in the manufacture of rope stock for bags to be used in the flour milling and building construction industries.

Taggart Corporation, as the company is known today, was organized in 1928, and, in that year, acquired the stock of Taggart Brothers Company. In the same year the corporation also acquired the stock of Taggart-Oswego Paper and Bag Corporation, which is now the St. Regis-Taggart kraft paper mill and bag plant at Oswego, and also acquired the Champion Paper Corporation, Carthage, New York.

Also, in 1928, the St. Regis Paper Company acquired a substantial interest in Taggart Corporation, marking St. Regis' entry into the kraft paper and bag field. In 1938, Taggart Brothers Company, Taggart-Oswego, and Champion were dissolved, and Taggart Corporation became the operating company.

In the early days, the mill made papers of rag, for mills (known as Cumberland Mills) grew up on that original site.

One of the most intriguing stories of this industry

Old Mill, 15 Years Ago, of the Rogers Paper Manufacturing Company, Goodyear, Connecticut, and Which Is Now Known as the Rogers Corporation Mill.

(Courtesy, The Rogers Paper Manufacturing Company)

PAPER MILLS,

IN

Compliance with the Recommendation of

The late Provincial *Congreſs*, and to *Encourage* the

Paper Manufactory,

WE now propoſe to give *one ſhilling* old tenor per pound, for all white *Linnen*, and *cotton* and *Linnen Rags*, ſuitable for making, either a writing or printing PAPER; which is two-pence per pound more than we have ever yet given: It is therefore hoped, that more attention will be paid to this affair in future, both from a principle of *patriotiſm* and *frugality*. The preſent alarming ſituation of the *Colonies*, renders it entirely needleſs to point out the utility of eſtabliſhing this, and every kind of *manufactory* among us; and if each family will but lend their aid, to encourage this buſineſs, by ſaving their *Rags*, there may be a ſufficiency of Paper made here, and entirely prevent the importation of that article, into this country.

Any Gentlemen, Traders or others, throughout the Country, that will ſo far promote the intereſt of *America*, by receiving *Rags* for the aforeſaid purpoſe, ſhall be paid ten per cent. commiſſions, and all the charges of tranſportation, either by land or water to ſaid Mills: And the ſmalleſt favours gratefully acknowledged by their very

Humble Servants,

BOIES and CLARK.

N. B. *One Copper per pound given (as uſual) for Check Rags, and all other courſe ſorts, that is either made of Hemp or Flax.*

MILTON, January 10th. 1775.

1765 BOIES and CLARK
1777 BOIES and McLEAN
1790 J. S. BOIES
1801 TILESTON & HOLLINGSWORTH

1889 TILESTON & HOLLINGSWORTH CO.

"Paper Makers for More Than One Hundred Years"

PRINTED ON FLEMISH WOVE WHITE 25 x 38—70

(Courtesy, Tileston & Hollingsworth Company, Boston, Massachusetts)

An Advertisement for Rags of the Milton Mill, in Massachusetts, 1775

is that of the Tileston & Hollingsworth mill, at Hyde Park, Massachusetts, in the southern outskirts of old Boston. Here is a mill which claims to be the oldest in existence in the country, and, counting in the years of its predecessor on the same site, the old Sumner mill, there is none to dispute its 219 years of paper production as being tops in longevity in America. Here is a mill which has survived in an unusually high tax area, not to mention some other complications, such as those famous Boston blue laws regarding work on the Sabbath and holidays, and Massachusetts State Labor laws affecting women and boys.

The Tileston & Hollingsworth partnership was formed in 1801, and, with that date, the mill could claim to be just as old as any in the country. However, under its "parent company" it goes back to 1728, and there are no challengers to that claim being the oldest. Here is the record: 1728, Charter issued by the Provincial Government to Thomas Hancock, and others, 1765, Boies & Clark; 1777, Boies & McLean; 1790, J. S. Boies; and, in 1801, Tileston & Hollingsworth.

In 1730, the mill on the Neponset River in Milton, making paper was then, as now, a process of felting together cellulose fibers. Now, however, the materials, from which the papermaker has to chose, have multiplied, and the equipment and machinery at his command are ones our forefathers never would have dreamed.

To illustrate this: In 1728, the Provincial Government issued a charter to Thomas Hancock, the uncle of the illustrious John (signer of the Declaration of Independence), and others, allowing them to set up a paper mill on the Neponset River, and, in return, for this investment of capital in a needed industry, protection was promised this infant company, provided it made 'in the space of twelve months next, after the Tenth day of December next, Two Hundred Rheams of good Merchantable Brown Paper and Printing Paper. Sixty Rheam thereof at least to be Printing Paper, and within the space of twelve months, than the next coming, shall cause to be made within this Province Fifty Rheams of good Merchantable Writing Paper of equel goodness with the Paper commonly stampt with the London armes over and above the aforesaid Two Hundred Rheams of brown Paper and Printing Paper.'

"Today, that much paper is made in less than an hour in our mill, which is the descendant of that first paper mill in New England; and the finished product is far superior," the firm says.

Present officers of Tileston & Hollingsworth Company are: Amor Hollingsworth, chairman of the board; Amor Hollingsworth, Jr., president; Arthur V. Howland, vice-president and Assistant Treasurer; Eugene H. Clapp, treasurer; and Howard Wallingford, vice-president in csharge of sales.

Boston office is located at 213 Congress Street, near the South Station, and is easily accessible by subway to the Mill at Hyde Park.

In the list of products made by T & H there are such well known papers as Flemish Book, Dorchester Plate, No-Coat Gloss, Fairmount Offset, Milton Index Bristol, Tiho Bond and Mimeo, to mention only a few of the "Papers of Old Fashioned Quality."

Tileston & Hollingsworth, although growing with the years, since the inception of its parent company in 1728, and now making paper with the latest devices, is still able to fill orders for rag and wood pulp papers of the quality and workman ship incumbent on a concern which does not take lightly the heritage of so many years experience and growth in skill.

S. D. Warren Company was started by Mr. Warren in 1854 with the purchase of a small mill in what is now called the city of Westbrook, Maine. The company name and the site have not been changed since. The

(Courtesy, S. D. Warren Company)

Picture of the Old S. D. Warren Company Mill of 75 Years Ago

the publishers of books. Wood pulp mills were installed later, and Cumberland Mills produced book papers for publishers of magazines and books.

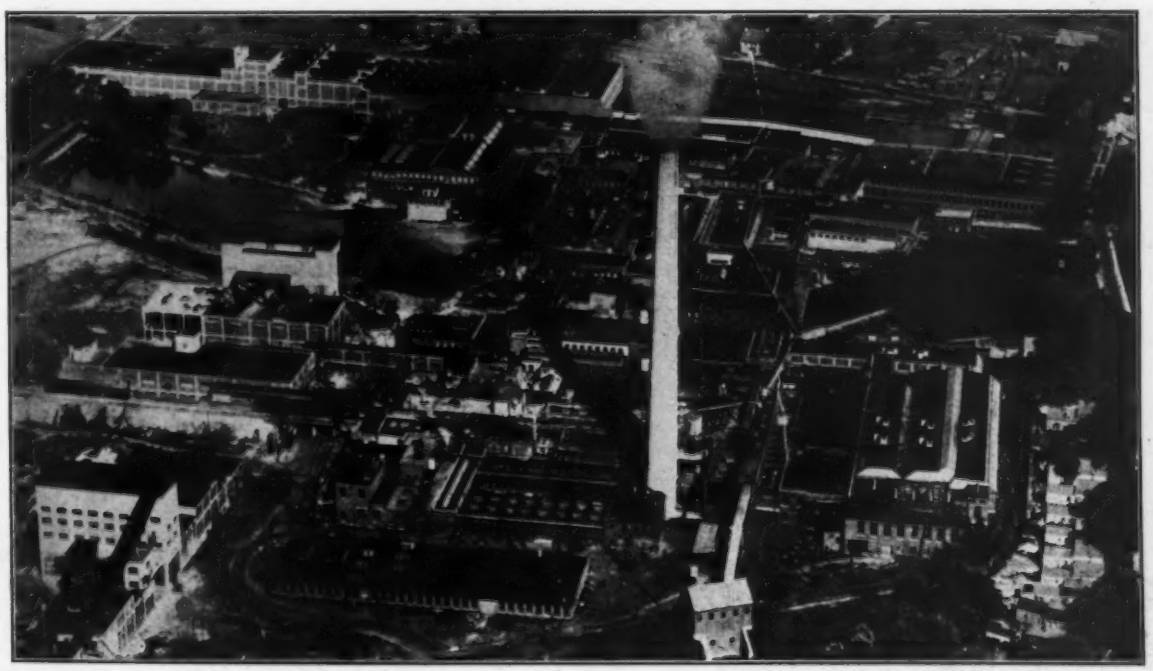
In the late eighteen hundreds and early nineteen hundreds, the major volume of sales was to magazine publishers. In those days the Warren Company supplied the paper for Munsey's, Scribner's, Century, Collier's, Youth's Companion and other leading magazines of the period.

In 1917, the Warren Company elected to withdraw from the magazine field, and to produce papers at Cumberland Mills for sale by paper merchants to the commercial printing industry.

In 1864, the Warren Company acquired a mill at Gardiner, Maine, and adapted it for manufacture of bible papers, which had been imported, prior to that time. That mill (called the Copsecook Mill) continues to make bible papers and carbonizing tissues.

When Byron Weston began the manufacture of linen record and ledger paper in Dalton, Massachusetts, 66 years ago, he deliberately set his standard, "the finest paper that it was possible ot make." The Defiance Mill was built 105 years ago, namely 1842, when Thomas Carson, a son of David Carson, who, with Joseph and Henry Wiswell, was part owner in the second Mill built in Dalton, decided to embark in the business of paper making himself. He chose a site on the Housatonic River, about three quarters of a mile upstream from his father's Mill at a spot called the "Dalton Jambs," (the word "Jambs" is an old

Air View of the S. D. Warren Company's Cumberland Mills on the Presumpscot River, Cumberland County, of About 7 Years Ago



(Courtesy, S. D. Warren Company)

(Courtesy, The Byron Weston Company)

Old Mill of the Byron Weston Company

English term for gorge) and the same year erected a mill which he called the "Aetna." Later this mill was called the "Housatonic," and, finally, in the early forties, received the name it now bears.

In 1840, Mr. Carson sold the Defiance Mill to Henry Chamberlain, who, with his son Ezekiel, ran the mill until the son's untimely death. Mr. Chamberlin then turned the management over to his nephews, Burr and Albert Chamberlin. In 1863, Burr Chamberlin, then the sole owner of the Defiance Mill, sold it to Captain Byron Weston, who had returned to Dalton, after two years of military service as the Captain of Co. K, 49th Regiment of Massachusetts Volunteer Infantry, (a Berkshire Regiment). Mr. Weston immediately began the manufacture of the ledger paper that was soon to be nationally famous as Byron Weston's linen record paper.

A short time ago a sensation was caused in a Texas town by the weight of a 400 pound safe suspended from a single sheet of Byron Weston ledger paper. This gives some idea of its strength.

An interesting development by Philip Weston, was the famous hinge in ledger papers. With this invention the pages of loose leaf books lie flat, when open, like the pages of a bound book.

At ground breaking ceremonies, Hale Holden, Jr., president of Byron Weston Company, last August outlined an extensive program of mill improvement, which, since then, has made execllent progress. A new finishing machinery building, connecting the two existing units of the Weston mills, will be a two story building of modern design, combining concrete, steel, brick and glass block construction. The new building will provide approximately 25,000 square feet of additional floor space for more efficient arrangement of calenders, trimmers, and other finishing equipment.

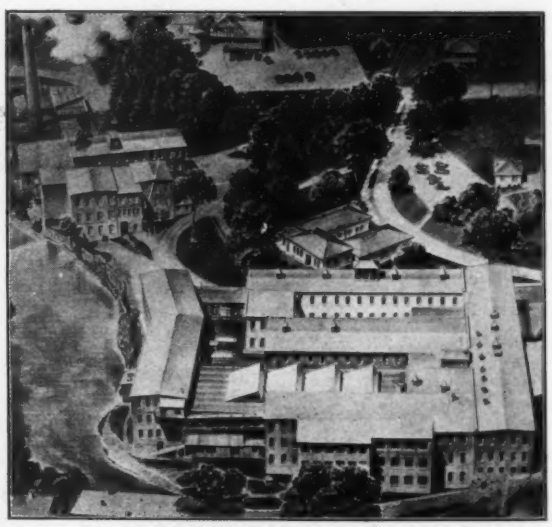
This new construction is part of an extensive program, which will include modernization of the paper machines at this mill, to provide for increased speed and greater capacity. First step in this direction was taken with the installation of a new Bird screen on the 112" machine. Installation of a new Victory beater, which is considered revolutionary in design, and the only one in existence at this time, permits simultaneous treatment of different types of fibers, requiring different beating time. It is equipped with automatic devices that maintain precision control during the entire cycle.

Paper making traditions of West Virginia Pulp & Paper Company were formed in Scotland, more than three quarters of a century before the first plant was established in this country.

As early as 1800, the grandfather of William Luke, one of the founders of West Virginia Pulp & Paper Company, was operating a successful paper making enterprise in Fossoway, in the County of Kinrosshire, Scotland.

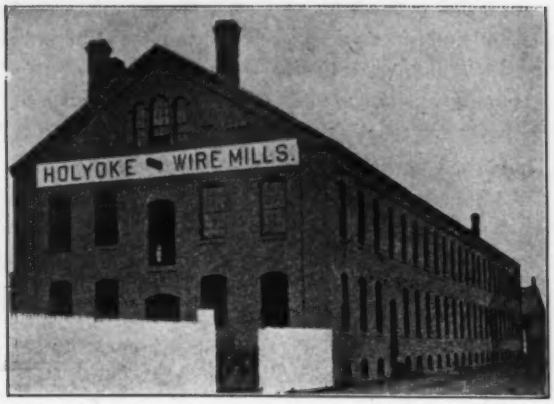
William Luke served eleven years' apprenticeship with his grandfather and father before coming to America in 1852 as a youth of 23. Upon his arrival he went to work in a mill, operated by a cousin, near Paterson, New Jersey. Afterward, he became manager of a mill of Jessup & Moore Paper Company, near Wilmington, Delaware.

The story is told that, while he was manager of this mill, a fire completely destroyed the paper machine that had been built by Bryan Donkin, in England. To expedite delivery of a new machine, he approached an official of a foundry and machine shop in Wilmington to build it for him. Although the foundryman said he knew nothing about paper machines, he agreed to build it after Mr. Luke said he would design the machine. Resulting machine was the first built by a concern, which, for years, has been a leader in the building of machinery for pulp and paper mills, and which



(Courtesy, The Byron Weston Company)

Modern, Present Mill of the Byron Weston Company, Dalton, Massachusetts



(Courtesy, The Whiting Paper Company)

Original Small Building Purchased for the Whiting Paper Company, Holyoke, Massachusetts

has since become the great Pusey & Jones Corporation.

Two sons of William Luke—John G. and David L. worked as superintendent and chemist, respectively, in a mill of the Richmond Paper Company, at East Providence, Rhode Island, the first concern in the United States to make sulphite pulp, commercially. It was these two brothers, financed by their father, who organized the Piedmont Pulp & Paper Company in 1888. This company built and operated a sulphite pulp mill in Maryland, across the Potomac River from Piedmont, West Virginia. Within a few months a third brother, Adam K., joined them, He was followed by three other brothers, William A. Luke and Thomas Luke, in 1892, and James L. Luke, in 1895.

In September, 1891, West Virginia Paper Company was organized. This corporation constructed a manila wrapping paper mill alongside the original pulp mill.

The following year West Virginia Pulp Company was founded, to build and operate a sulphite pulp mill at Davis, West Virginia. This mill was closed in 1920. In 1897, the three organizations were consolidated into West Virginia Pulp & Paper Company.

In 1899, the present company was organized through a merger with the Morrison & Cass Company, at Tyrone, Pennsylvania. In the same year, construction of the Covington, Virginia, plant was begun.

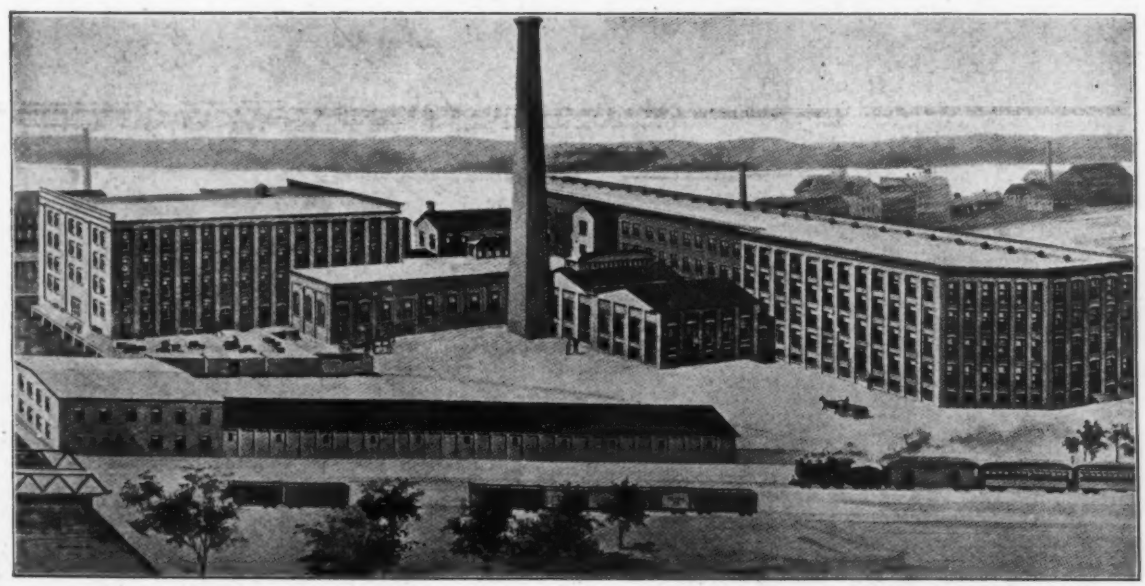
In 1904, the Mechanicsville, New York, plant of Duncan Paper Company was purchased, and, in 1906, a plant in Williamsburg, Pennsylvania, was acquired.

The company's newest plant, a modern kraft pulp and paper mill, was constructed at Charleston, South Carolina, and began operations in June, 1937.

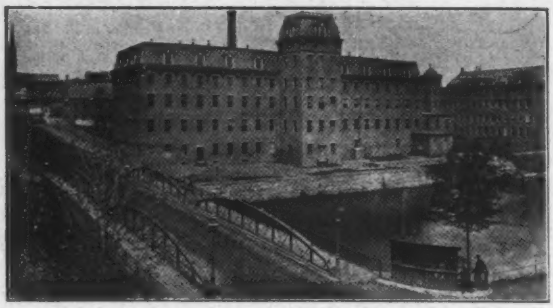
In the 40 years from 1899 to 1939 the industry's production capacity of both wood pulp and paperboard showed a tremendous increase. During these 40 years the productive capacity of wood pulp, paper and paperboard increased about 6 fold. In the years 1939 to 1945, there was an increase of approximately 3 million tons in production capacity for pulp, and a similar increase for paper and paper board. This increase is quite significant, since it reflects the installation of integrated pulp and paper mills, versus construction in earlier years of paper mills, dependent upon purchased pulp. Wood pulp capacity increased 33½ per cent from 1939 to 1945, as against an increase of only 17 per cent for the same period in the case of paper and paperboard. Not only has there been an increase in the industry's productive capacity, but the ratio of production to capacity has been continually upward.

From 1899 to 1939, the industry utilized around 80 per cent of its existing capacity. By the end of the war,

Present #1 Mill of the Whiting Paper Company, Holyoke, Massachusetts



(Courtesy, The Whiting Paper Company)

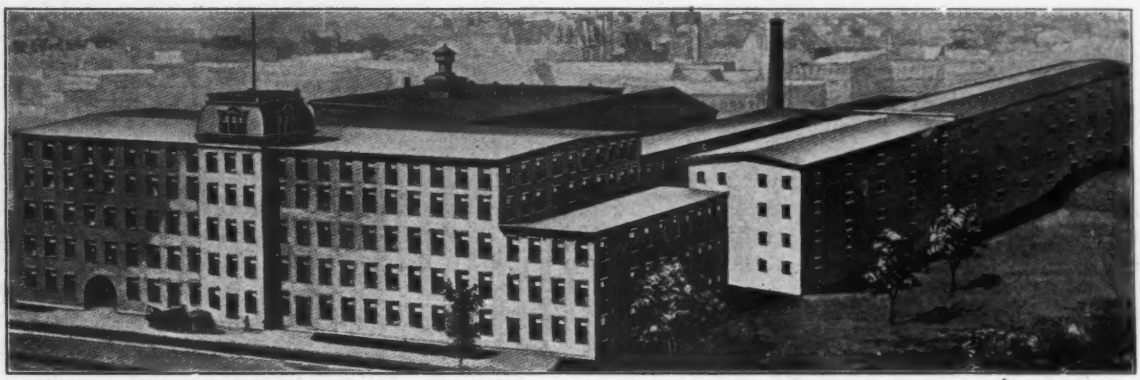


(Courtesy, The Whiting Paper Company)

Original #2 Mill of the Whiting Paper Company, Holyoke, Massachusetts

90 per cent of capacity. Due to a better supply of labor, in 1945, the industry was operating at approximately a more even flow of raw materials, and an incessant demand for paper and paperboard products, the industry, in 1946, operated close to 98 per cent of capacity. Assuming a similar ratio of production to capacity, in 1947, this should result in 1947 total paper and paperboard output of about 20,200,000 tons.

With these additional new facilities and improvement in operation, the industry's 1947 volume of paper and paperboard production is expected to increase by about 5 per cent over the previous year. In the case of wood pulp it is anticipated that the paper and paperboard mills' increased demand for pulp will be satisfied through increased domestic production, substantial additional pulp from newly installed Canadian production operated by United States companies, as well as larger supplies of imported market pulp.



(Courtesy, The Whiting Paper Company)

Present #2 Mill of the Whiting Paper Company, Holyoke, Masachusetts

CHAPTER XI

What Were and Are the Markets For All Grades of Paper?

A WORLD wide shortage of practically all varieties of paper has been greatly emphasized during the year 1919. Dearth of supplies in this country was due, largely, to the lack of raw materials, and the inability of pulp and paper mill machinery to supply the enormous demands of consumers. Difficulty in getting coal, labor troubles, poor railroad service, and inconveniences caused by the severity of the Winter also helped to increase the shortage in all lines of paper throughout the country.

During the year 1919, newsprint was one of the most talked of commodities in the paper market. Retail merchandising, throughout the country, flourished, and publishers were besieged for advertising space by merchants who could afford more money for publicity than ever before.

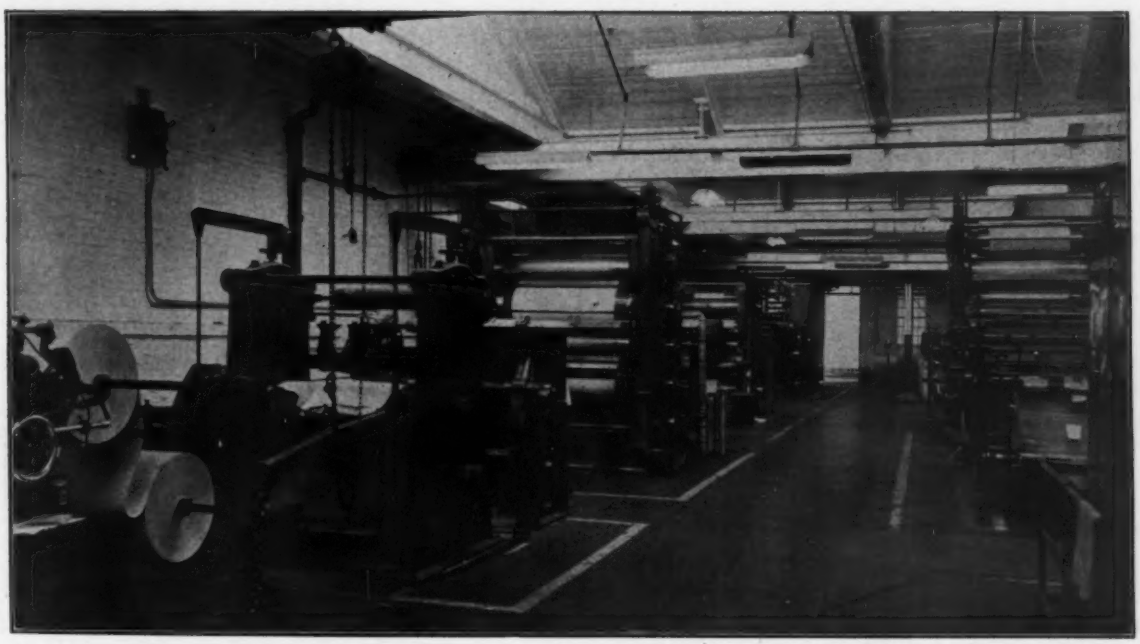
With the encouragement of increased business, publishers decided to pay higher prices for their paper, and accept more advertising. At about this time, spot news had disappeared, and publishers demanded that mills deliver the maximum tonnage called for in their contracts. A newsprint shortage was imminent. Contract news remained at 3.75 cents per pound, which, it will be remembered, was the fixed price set by the Federal Trade Commission, while transient sold around 5.25. During the month of December, spot news reached 9 cents. On the heels of these higher quotations some paper plants turned their machines to the manufacture of newsprint, but, coincidently with this turning of machinery from other varieties of paper to newsprint, the volume of advertising continued to increase, and caused publishers to seek more paper. Additional machines on newsprint, therefore, did not relieve the situation very much.

The year 1919 started with heavy buying in the fine paper market, at the low prices then predominating. Nearly half the year's supply had been stocked up by the paper merchants, when an easing off of this trading in March resulted in a marked slump in quotations. Market remained relatively quiet until June, when again orders began to besiege the paper makers. Outlook was for a bullish market, and once more mills produced to their capacity.

During August and September, production costs soared, and this, together with tremendously increased demand, gave way to fresh price advances. Quotations for all grades rose. Coal, too, became scarce, and a curtailment in production, to some extent, was noticed in the fine paper field.

Europe's paper mills were crippled, and, during the Summer, American plants were being looked to as a

Finishing Room, Where Paper Is Cut for Rolls or Sheets, As Desired



(Courtesy, The Byron Weston Company)

(Courtesy, Keith Paper Company)

Wet End of Fourdrinier Paper Machine

source of supply. But this rush on domestic mills could not continue without a consequent trade congestion, which climaxed the United States paper industry in the year 1919.

In 1920, newsprint, book and fine papers were the most prosperous segments of the domestic paper mills. All through 1920, when the manufacturers of most grades of paper were sitting tight, and wondering when things would pick up, newsprint proved the one bright spot. One peculiar feature of the newsprint market in 1920 was the relatively high price for contract news, as against spot news. This was low, owing to the hold off in buying by the smaller publishers, and because of the cancellation of large orders from abroad. This situation made it possible to procure newsprint in the open market at a lower figure than that at which it could be bought on contract.

The fine paper industry entered 1921 in a strong position, verging on prosperity. Buying ceased suddenly, and left printers and merchants with heavy inventories, bought at close to the high level of prices. Fine paper mills paid high prices for their raw materials. Upon puncturing the bubble of inflation, the resultant slow demand caused manufacturers to liquidate extensively, throughout the length and breadth of their establishments, and to busy themselves, again, with stimulating the sales management, which had long been left in a neglected state.

One of the outstanding features of the irregular 1920 market was the large increase made in sulphite bonds. This grade proved both serviceable and profitable, and has continued in popularity ever since.

Box boards probably suffered more during 1921 than any other branch of the paper industry. The board industry is one that must do business on a large scale, in order to obtain profit. Stubborn hand to mouth demand played havoc with disposition and profits alike, and it was the full realization, that is was impossible to operate without loss, that most of the board mills were closed for fractions of the year.

In 1922, the paper merchant learned that a very complex line, with overlapping brands, may, at times, bring about a greater total volume of sales, but it introduces so many slow moving items, and causes such manufacturing inefficiencies and costs in bad turnovers that it decreases total profits. He might sell more goods if he were agent for, and stocked, all papers made in America, but he certainly could not make money.

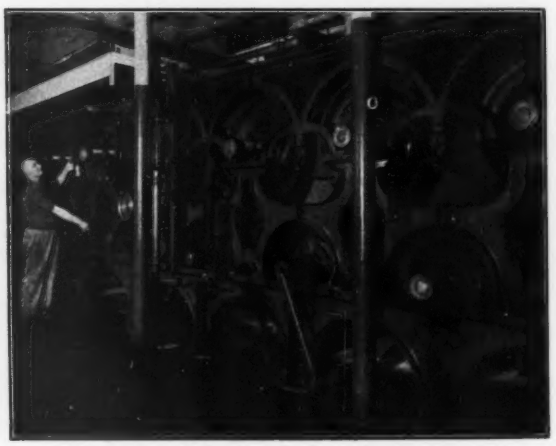
Tendency in 1922, therefore, throughout the industry, was toward a smaller number of brands, or more or less fixed quality and characteristics. Naturally, following this was the tendency toward closer relationships between the merchant and the manufacturer. The merchant trimmed his lines to those on which he could get volume and insured turnover, and on which he could obtain the service and value which the mill could guarantee only through standardized goods on a practicable mass production basis.

The first two or three months of 1923 found the industry in the midst of a baby boom, which somewhat spent itself by the end of Spring. The new year opened well, and business was just getting to a point where it was safe to predict an extraordinarily good year when the lid blew off Teapot Dome and a number of other things, and everybody went to the show.

All of the big corporations, with world wide influence, realized that the domestic and foreign political situations were having an extremely bad effect on business, and they took steps to remedy it. The Morgans loaned France an unlimited amount of cash, in spite of the fact that they knew that the country's credit was taxed to the utmost, not because they expected to make big money directly out of the transaction, but because they knew that anything they could do to stabilize European conditions would help them eventually.

The Mellon tax revision plan, from which every business man was hoping to gain great benefit, was rejected, in favor of a less desirable substitute, by the House of Representatives. The oil scandal had shaken the faith of the people in those who guided the destinies of the nation. Sharp decline in the franc gave the exporters grave anxiety.

In the face of these uncertainties, there was a



(Courtesy, Keith Paper Company)

Drier Section of the Fourdinier

general attitude of hesitation and unwillingness to make commitments for the future. Programs for expansion of old, or the undertaking of new enterprises, were held in abeyance, and hand to mouth buying became the rule of the day. Everyone was conservative, and everyone was cautious.

Out of the debacle emerged the Paper Exchange, a genuinely good idea, which had, for its purpose, the bringing together of all the various branches of the industry for public trading under one roof. There was only one trouble with this, and that was, like John Brown, it was several years ahead of its time.

There had been too little time spent in ploughing and fertilizing the ground for the reception of this valuable seed. In consequence, it sprang up overnight, and withered in a day. While it convinced the board industry that the idea was not workable, at that time, it also convinced the entire paper industry of its ultimate workability, and pointed the way to the next forward step.

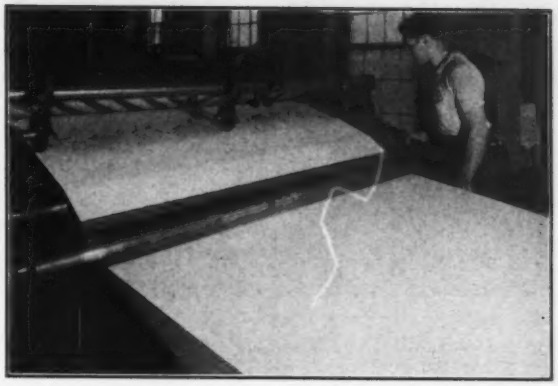
The board manufacturers then organized an association for carrying on the work, both of the exchange and the Armstrong Bureau, in a somewhat modified form. As soon as it really got limbered up for smooth running, the late Mr. Daugherty propounded his nonsensical syleogism that all trade associations were illegal.

This weighty declaration from the Department of Justice had little effect on the older trade associations, which had been operating for years in a manner that had been proved legal, and they simply continued to do so.

The year 1924 had seen some notable achievements by the industry, one of the most notable being that

(Courtesy, Keith Paper Company)

Press Rollers of the Paper



(Courtesy, Keith Paper Company)

Slitting and Cutting the Paper

accomplished by the box board men, leading to the elimination of Sunday work, and to the substitution of the three-tour system for that of the two-tour system, formerly in vogue.

Fine papers experienced, during 1924, the various irregularities felt throughout the paper industry. The first five months of the year, however, were superior months, and, while depression followed until Fall, total sales amounted to $137,500,000, which was only 0.5 percent less than 1923, and 6.3 percent greater than in 1922.

The writing paper industry continued to enjoy its phenominal growth, and, in 1924, the mills produced, and the country consumed, 5,000 tons of paper every 48 hours.

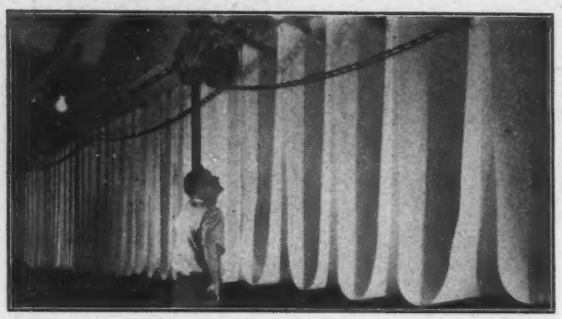
The book paper mills had a fair year, although not operating to capacity. Average operation was in the neighborhood of 80 to 90 percent. While the magazines and trade papers appeared to use their normal tonnage, the demand of lithographers, label printers, envelope and tablet manufacturers fell considerably below normal.

North America in 1924 made a new record for newsprint production, with 2,900,000 tons as the amazing figure. Mills of the United States made 1,471,000 tons during the year, or 14,000 tons less than in 1923, and 40,000 tons less than during the high mark made in 1920. Canadian production was 1,353,000 tons, or an increase of 87,000 tons over 1923, and a production 54 percent larger than in 1920.

In 1924, the publishers in the United States used nine-tenths of the Canadian production and 156,000 tons imported from Europe. Consumption was 50,000 tons greater than the record consumption of 1923, and 28 percent more than in 1920.

The year 1925 recorded a distinct advance, both in production and in the volume of business transacted. On the other hand, competition was so keen, and production was so heavy, that the margin of profit, in most sections of the trade, was smaller than it should have been.

Production of paperboard products reached a new



(Courtesy, Keith Paper Company)

Modern Loft Drying of Paper

high in 1925. This section of the paper industry represented nearly 30 percent of the total paper tonnage. One of the most noteworthy events of the year was the formation of the Paperboard Industries Association, by a consolidation of three former associations, representing a total tonnage volume of more than 70 percent of the total production.

Exports of paper and paper products, from the United States during 1926, reached a total value of $26,828,674, the highest figure attained since 1921, which totaled about $29,000,000. Almost all items in the paper schedule contributed to the rise in value of the total exports, the heaviest gains being registered in shipments of boards, writing papers, and surface coated papers. In addition to paper, boards, and manufactures, $4,963,508 worth of paper base stocks were shipped from the United States to foreign countries in 1926.

Feature of the newsprint industry, during 1926, was the fact that the world's leadership in production passed to Canada. The United States continued to be by far the greatest user of this product. Out of the total North American production of 3,768,000 tons, Canada furnished 1,882,000 tons, an increase of 24 percent over 1925, and surpassing by 195,000 tons the output in the United States.

Paper making machinery manufacturers reported that 29 new machines, with a daily capacity of 1,374 tons, were installed in the United States in 1927, representing an increased capacity for the industry, as a whole, of 426,000 tons a year. There were also numerous increases to capacity by improvements and betterments in existing machines.

Total increased capacity for 1927 was approximately 700,000 tons. However, the total volume of production showed very little change over the output produced in 1926, which indicated that 23 percent of the capacity was idle. Still, orders for 1928 had already been placed for thirteen new machines, which further increased the capacity by 250,000 tons.

Value of paper and paper products, imported into the United States during 1927, according to the Department of Commerce, was $149,365,343, compared with $139,499,144 in 1926. Raw materials, valued at $113,632,210, were also imported. Paper and paperboard products, exported from the United States in 1927, were valued at $26,975,670.

Although, generally speaking, industry and commerce prospered in the United States in 1928, the equilibrium of the paper industry was unstable. While the volume of production of both pulp and paper reached new high levels, the margin of profits was seriously affected, due, mainly, to over-production in the industry, which resulted in intense competition for orders, and considerable price cutting. Record of the year was all the more disappointing, since there was no doubt that the paper mills exercised more efficient management, and greater economy of production, than ever before.

Total volume of business in the paper industry, during 1929, broke all preceding records, and was 6.5 percent higher than in 1928, although conditions in general were materially affected in the closing months of the year by the stock exchange debacle in November. While some sections of the industry enjoyed a profitable year, notably the fine paper division, overproduction of newsprint, book papers, kraft paper, and boards resulted in keen competition for orders, and again considerable price cutting.

Statistical department of the American Paper and Pulp Association estimated the production of paper and paperboard in 1929 at no less than 11,140,235 tons.

During 1929, about 1,400 tons of daily capacity were added to the industry, the greatest proportion being in the wrapping paper section. According to reports from paper making machinery manufacturers, 27 new machines were installed in the United States in 1929. These machines represented an increase in capacity for the paper industry of 428,000 tons.

Exports of paper and paper products from the United States, during 1929, again reached a new high, with a valuation of $37,379,685. Printing papers shared with building boards the distinction of having registered the most outstanding gains during the year.

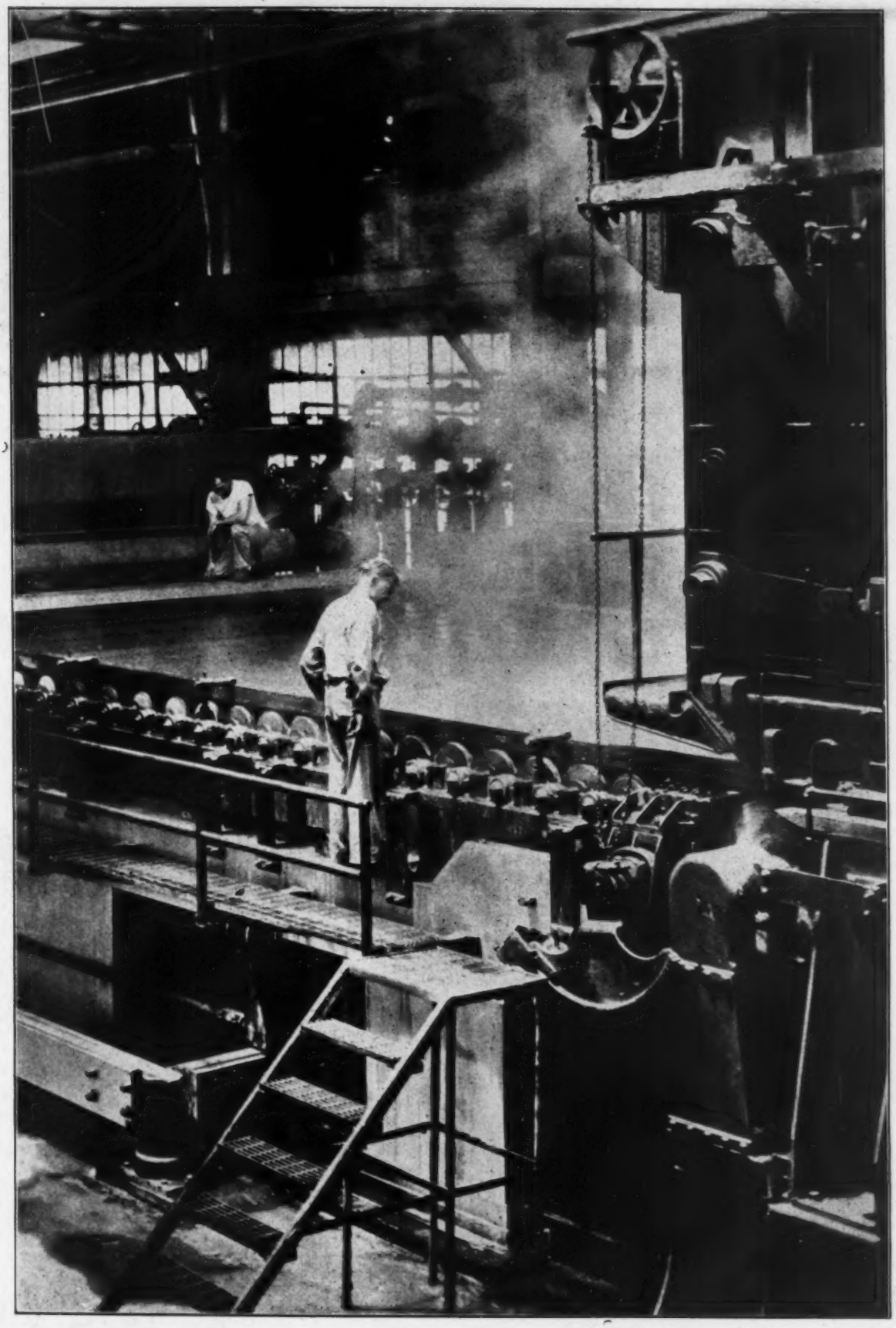
Considering the general curtailment of business, during the year 1930, the paper and pulp industries made a fairly satisfactory showing, and were less seriously affected than most other large industries. Volume of paper business, transacted during the first six months of the year, was well up to the average of the corresponding period of 1929. However, during the latter half of the year, a decided slump was experienced, and, in many instances, profits, which had been made in the first half of 1930, were swallowed up.

Affected by the world wide depression and declining

(Picture, Opposite Page—)
(Courtesy, International Paper Company)

Forming the Sheet

Wet pulp, flowing from the headbox at the right, as the sheet is formed on the Fourdrinier wire. Water is pouring through the wire. At extreme left is the supplementary headbox, an essential factor in forming a sheet of Fourdrinier board.



(Courtesy, Keith Paper Company)

Sorting the Finished Sheets

prices, exports of paper and paper products from the United States decreased rather heavily in 1930. Total exports of paper and paper products, in 1930, were valued at $28,967,615, as compared with $35,471,341 in 1929.

In 1931, the fine paper market was the most stabilized in all of the paper industry, despite the fact that, in June of that year, the No. 1 sulphite bonds declined in price, and, in December, there was a decline of about 10 percent in prices of rag content papers. These declines did not indicate instability, but, rather, an orderly adjustment to meet market conditoins. In view of the fact that the price of raw materials had shown a decline of 25 percent from December, 1930, to December, 1931, and even though this represented only 40 percent of costs, some of the manufacturers felt that is was better to liquidate their papers, although any decline in costs, under conditions prevailing at that time, had long since been offset by the large increase in overhead, due to slack time.

These papers held a unique position, in that they declined and fully liquidated in 1921, and, over a period of ten years, there were but few price movements. During this ten year period, manufacturers had absorbed all advances in raw materials, which occurred during the years of prosperity. Most of the mills had reconditioned themselves, so that their physical equipment for making better paper was never finer, and this, likewise, enabled them to manufacture at a lower cost.

Operations of the mills in 1931 averaged 67 percent of normal, as compared with 83 percent production in 1930. Shipments averaged 69 percent, so that mill stocks did not accumulate, but, rather, declined 17 percent. Merchants' stocks showed a larger decrease.

Percentage of profits on sales, over the ten year period 1921 through 1930, and the earnings on capital invested by the mills, were modest, to say the least. But, in 1931, they dwindled to nothing, and minus, in some cases. There is only one turnover of capital in a normal year, and, with risks involved, the returns are very limited. In 1931, the capital turnover was only .7.

Capacity in 1931 was estimated at 14,000,000 tons. Production of 9,381,140 tons, for that year, indicated operations at 64 percent of capacity, as compared with 73 percent for 1930, and 82 percent in 1929. Thus, it became strikingly evident that capacity was beyond consumption, even under normal conditions. Not only was the industry burdened with over capacity in different grades, but the shifting of manufacturers, from one grade to another, intensified competitive conditions, with gains to no one.

Paper production in 1932 was about equal to the volume of 1923, but, in relation to capacity, it was the lowest on record. Third year of the depression brought to the writing paper industry, as it did to all other industries, a further decline in the volume of business. For 1932, production averaged 58 percent of normal, and shipments 59 percent, representing 15 and 16 percent declines, respectively, from the 1931 average.

There was more liquidation in writing paper than many people seem to realize. In 1925, writing paper prices had declined 35 percent from the 1920 peak. In 1929, during the height of the boom, they were down 38 percent from the 1920 peak, and, in 1932, they were liquidated 46 percent below the 1920 level.

Reports, received from all paper making machinery manufacturers, indicated that six new machines, with a daily capacity of 181 tons, were installed in the United States during 1932. This was, by far, the smallest number of machines, and the smallest capacity, installed in the preceding thirteen years. Many of the paper machines installed were not projected to fill any urgent need or demand for paper. They were installed in connection with pulp mills, where it was found impossible or unprofitable to dispose of the pulp output. It was felt that the only way out was through paper machines.

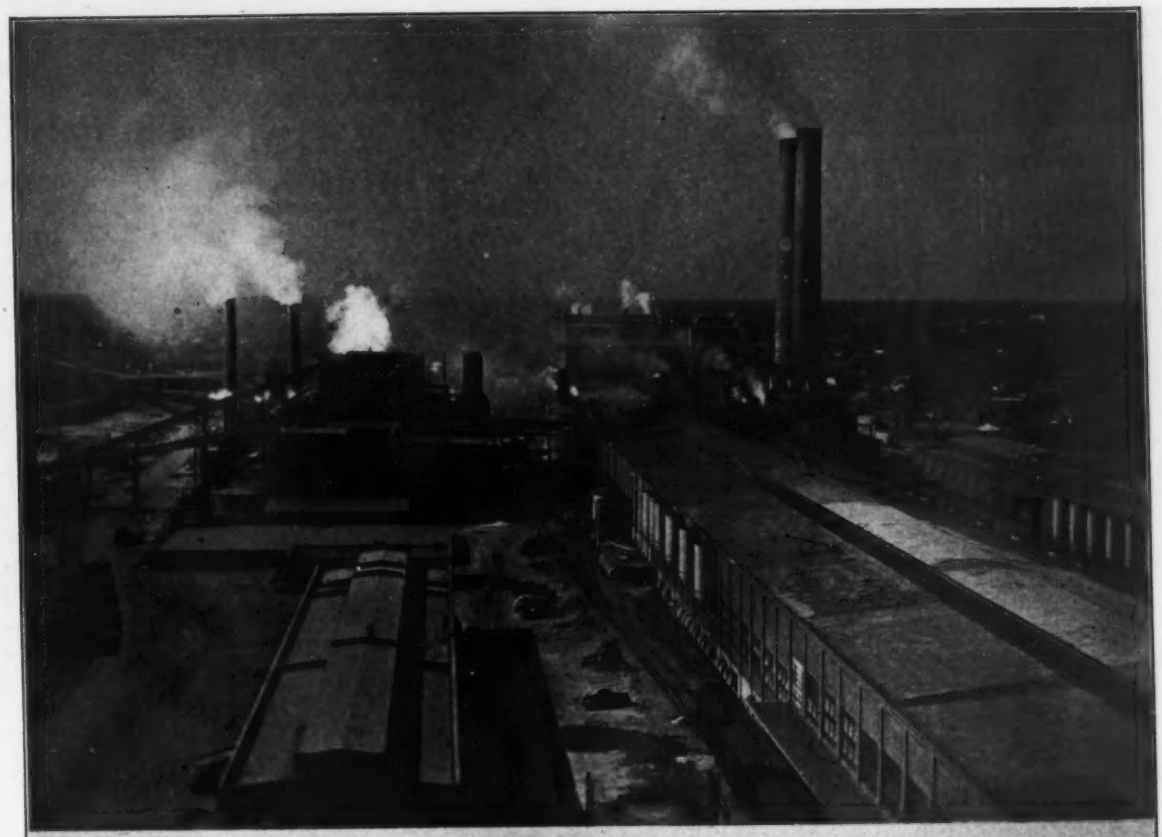
Kraft paper industry entered the year 1933 determined to free itself, if possible, of the many destructive practices with which it had been beset for years. In the late Summer of 1932, the market descended to the lowest point in its history, to that time. Price of about forty dollars a ton, with sales at even lower levels, was below cost to every mill, and resulted,

---

(Picture, Opposite Page—)
(Courtesy, International Paper Company)

Container Board Mill, With Chemical Recorvery Plant, International Paper Company, Georgetown, South Carolina

Top, Recovery plant, power plant, and pulp mill; Bottom, View across the pond, where processing water is purified and stored. Rake in foreground keeps surface free from algae and sludge.



not only in serious losses, but caused the discontinuance of operation of several mills.

There was a gradual improvement in conditions, and the market price, by July, 1933, had climbed to $60 a ton. With the inflationary talk of mid-Summer, an unprecedented demand occurred. All mills were flooded with orders, and the industry operated, during this period, to a greater percentage of capacity than it had for the past few years. Natural result of such a market was continued advance in price until, in October, a market level of $77.50 was reached.

Serious problem confronting the industry in 1933 was the merchandising of its product. Capacity to produce kraft paper had been almost double the demand, for some time. Such a condition naturally created the keenest competition, inevitably bringing destructive and unfair sales practices along with it.

Filing of prices under the paper industry code went a long way towards eliminating many of these unfair prices. Thereafter, buyers were not able to induce a manufacturer to reduce his price, because that price had been filed with the executive authority, and no sales could be made at a lower figure prior to the filing of a lower price.

Outstanding development in 1933, however, was the very obvious change in the attitude of the individuals in the industry towards their own businesses, and towards that of their competitors. Point of complete cooperation, of course, had not yet been reached. But it cannot be denied that every kraft paper manufacturer realized, at that time, that the success of his business depended upon the success of the entire industry, and that his company could not progress at the expense of his competitor.

Conditions in the book paper industry for 1934 showed somewhat of an improvement over the conditions existing for several years previously. The trade, however, continued to suffer quite severely from the condition of the depression and economic conditions that had been experienced for several years. On the whole, however, the industry, operating under the paper industry code, which was approved by President Roosevelt in November, 1933, had tended to stabilize conditions that were, no doubt, an improvement over the conditions existing prior to the code operation.

The 1935 recovery has been spoken of, from time to time, as a natural recovery which took place not because of, but in spite of, governmental experiments. Writing paper production increased from 417,859 tons in 1934 to 480,500 tons in 1935, a gain of 15 percent. Production, as compared with the practical capacity of the industry, was 59 percent in 1934, and 68 percent in 1935.

In common with other divisions of the paper industry, kraft paper felt the effects of returning business confidence, and the volume of shipments increased substantially in 1935 over 1934, and exceeded, slightly, the greatest volume heretofore recorded in any one year.

(Courtesy, International Paper Company)

Off Go the Rolls of Paper into the Waiting Freight Cars to be Filled with Many Tons.

In 1936, total paper production in the United States achieved a new high record. Production reached 11,975,552 tons, as compared with 10,479,095 tons in 1934. New high was confined largely to kraft wrapping and board grades, but printing papers (book, cover and writings) generally made gains corresponding to the gain in the volume of general business, but did not reach the 1929 levels.

Last quarter of 1936 witnessed a striking change in the paper industry. Almost overnight the psychology changed from a buyer's to a seller's market. Underlying fundamental forces had been pointing in this direction for many months. But it was not until the late Fall that the market was generally willing to recognize that consumption and demand for printing papers were approaching the highest levels in several years, and that pulp, the basic raw material, had become a scarce commodity at a rapidly increasing price.

In 1937, total paper production in the United States again exceeded previous records. Book and writing paper production in 1937 not only exceeded the output of 1936, but, also, the production of 1929.

The paper industry began 1937 on the high crest of a wave, which became top heavy in the Spring, subsided in the Summer, and turned to ebb tide at the close of the year. In the first five months of the

---

(Picture, Opposite Page—)
(Courtesy, International Paper Company)

Pickin' 'Em Up and Layin' 'Em Down!

How the Giant Crane Handles the Pulpwood Logs of the Georgetown, South Carolina, Plant of the International Paper Company.

(Courtesy, Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin)

Snow Covered Log Lot

Aging and Storing of Pulpwood Is Just as Important in Winter as in Summer. Acres of Cordwood Cover the Reserve Yards of the Nekoosa-Edwards Paper Company Grounds

year, the industry, as a whole, operated at more than 90 percent of capacity, the highest sustained rate in any similar period in the history of the industry. In sharp contrast, operations declined most drastically in the fourth quarter, so that, by December, the industry was operating at 55 percent of capacity. Despite the slackened rate of operations, the industry's operating ratio, at 85 percent of capacity, was the highest on record, with the exception of 1920, when it was 86 percent.

After two years of successive new high records, paper production in 1936 suffered a decline. But production was only 12 percent less than the record total, up to that time, made in 1937. Wrapping paper and paperboard showed comparatively small declines. Printing paper grades declined about 16 percent.

It is interesting to note that, in 1939, the capacity of the paper industry, and its actual production, were more than twice that of the industry's capacity and production of twenty years ago.

American paper industry in 1939 established the third new high record production in the past four years. New records were established in the printing paper divisions, but the output of these divisions was only slightly higher than the volume in 1929. On the other hand, kraft paper and paperboard continued the tremendous gains in consumption, reflecting the new and growing uses for these products.

Production of paper and paperboard, in the United States in 1940, totaled 14,483,709 tons. Most of the gains were registered in kraft paper and paperboard, following the unusual development in the south, and the increased consumption of these products through new uses.

Because of the war, exports in 1940, of all grades of paper and paper products, were valued at $65,197,000, as compared with $30,491,000 in 1939, an increase of 114 percent.

In 1940 the capacity of the industry and its actual production was about fifty percent higher than it was in 1925, only fifteen years before. Heavy demand for paper and board, plus lend lease and exports, put a severe strain upon inventories. Question of future pulp supplies became one of much concern to the United States consumers. Imports for 1940 dropped 40 percent, while exports increased 250 percent over 1939. Fortunately for the domestic paper and board industry, sufficient wood pulp production capacity was available to offset most of the loss of the European imports. However, many non-integrated mills and semi-integrated mills were cut off from their normal European sources of supply. Increased domestic production and Canadian imports were not enough to keep these mills in full operation.

In 1941, the United States paper industry mobilized for a wartime economy. Manufacturers obtained their materials at the governments pleasure, and sold their output at prices designated by the Government, and to persons designated by the Government. Under such conditions the Government dictated priorities, products, prices and markets. Because of the increasing demands of the growing government organizations, the armed forces, exports, and larger needs for the domestic industry, production and the sale of paper

established another new high record in 1941. Machines produced more paper than operators believed possible a year before. Total United States production, of paper and paperboard, reached 17,762,365 tons in 1941.

During 1942, an important activity of the Office of Price Administration in the field of paper was informal action. Voluntary agreements were reached, maintaining the prices of various grades of wood pulp. Other voluntary agreements were made, covering the prices of converted paper products, and certain types of paper board and paper board products.

During the Summer of 1942, OPA issued a number of letters, freezing prices, or requesting that manufacturers maintain prices already established. OPA used more formal controls to stabilize paper prices, beginning with a wood pulp regulation (No. 114) issued in the middle of April. A temporary regulation, establishing a maximum price for newsprint, was converted into a permanent regulation. About the same time schedule No. 129 appeared. This latter schedule fixed prices for many industrial papers and converted paper products, and replaced the voluntary, informal controls that had been in effect.

Heavy demand for paper and paper products, that characterized the first quarter of 1942, fell off sharply during the second quarter. Conversion of civilian industries had decreased the demand for many paper items. Because of these conditions, OPA made several refinements and adjustments of regulations already in existence, and issued new regulations to eliminate inequities, or to provide more simplified methods for determining maximum prices.

Paper and pulp industry of the United States, during 1943, was probably more affected by government orders and pronouncements than in any other year of its history. Despite these entanglements, production of paper and paperboard reached 17,035,688 tons.

What actually happened during the year, that made this tremendous production possible, in view of the shortage of pulp and dwindling supply of wood, was that some 450,000 tons of wood pulp from inventory were used up during 1943. Less pulp was exported under lend lease. About 500,000 cords of wood inventory were used up by paper mills in 1943. Greater use of waste paper, than actual receipts, resulted in reducing inventories by some 300,000 tons. There was further depletion of inventories of other non-fibrous materials, and greater use of non-fibrous materials. These five factors made it possible to produce 1,300,000 tons more than could have been made from the new production of raw materials.

Writing paper production in 1943 was 805,000 tons, as compared with 853,463 tons in 1942, which was the record, up to that time. Shipments to market in 1943 were in excess of the year's production, and resulted in depletion of inventories at writing paper mills to the lowest point since 1920.

In 1944, the industry produced 17,182,804 tons of paper and board. For the industry, as a whole, this was somewhat higher than the year before. Production of paperboard increased nearly 400,000 tons over 1943

Paper Chemists at Work
And This Is the Modern Paper Laboratory of the Nekoosa-Edwards Paper Company, Where Paper Receives More Than Twenty-Four Tests Before Release on Shipment.

(Courtesy, Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin)

production, whereas the production of all grades of paper declined about 200,000 tons.

Shipments to markets in 1944 were in excess of the year's production, and resulted in further depletion of inventories at writing paper mills. In the second six months of 1944 the writing paper industry was shipping to the United States Government and its agencies a larger tonnage and a larger proportion of its production than at any time in the war. Conversely, shipments of writing papers to commercial markets were the smallest amount of any time in the war.

Packaging needs of war materials were met in satisfactory fashion. Dwindling supply of raw material forced necessary economy in paper. These economies were brought about by limited restrictions on consumption, and by the reduction of basis weights, wherever the functional use of a sheet could be maintained, despite the spreading of fiber over a large area.

Production of wood pulp in the United States increased by 44 percent in the five year interval from 1939 to 1944. But this gain was inadequate to produce all the paper required by the military services, essential civilian needs, and the amounts of pulp and paper required to be furnished under lend lease and good neighbor policy.

In 1945, the industry produced 17,370,965 tons of paper and paperboard. For the industry, as a whole, this was a gain of 1 percent over 1944, but 2 percent below the 1941 production of 17,762,365 tons. Production of paperboard, at 8,906,000 tons, was slightly under the production of 1944, but 6 percent higher than the 1941 output. Paper production, including newsprint, at 8,469,000 tons, was 3 percent higher than in 1944, but 10 percent below the previous peak of 9,362,000 tons in 1941. Fine paper production at 1,000,794 tons in 1945 was close to its previous peak of 1,043,475 tons in 1942. Book paper output, at 1,501,015 tons in 1945, was 26 percent below its 1941 peak.

With the war over, considerable improvement to existing equipment, and the installation of many new machines, was planned. But a bottleneck was the inability of machinery manufacturers to promise delivery before eighteen months to two years. For 1946, machinery manufacturers had definitely scheduled the installation of twenty-seven new paper machines, having a daily capacity of 2,521 tons. These machines, plus improvements to existing machines, added about 1,000,000 tons of annual production to the capacity of the industry, which was 19,360,000 tons at tthe end of 1945.

Since the termination of hostilities, the supply-demand situation in the paper industry has perplexed sellers, buyers and consumers. During the war, users were on short rations, because mills had an insufficient supply of raw materials and labor to produce all the paper that existing machinery could turn out. Supply, so far as the consumer was concerned, was further curtailed because the military services and other government agencies had first call on 35 percent of the production. Since the end of hostilities, military requirements have been reduced to the vanishing point. Order M-241, which required the withholding of 35 percent of production for government needs, was revoked. Sweden was shipping wood pulp to augment our domestic supply, which made it possible to increase total paper production to new record levels.

Nevertheless the supply-demand situation was extremely tight. The consumer was puzzled by the fact that production was higher, government takings were less, and yet he could not obtain easily all the paper he wanted.

There was no question about the fact that the civilian market had been receiving an increased supply of paper in 1945. But the demands of the consumer increased considerably, once the limitations on his consumption were removed. Added to this were the subnormal inventories in the hands of merchants and consumers. Publications were beginning to increase the weights of paper they used. Some of the large publications were planning new publications, with circulations running into the millions. Newspapers were increasing their size, to capture the record breaking advertising lineage now available to them. Direct mail advertising, booklets, catalogs, and many new uses for paper and board, were all adding to the tremendous demand on production.

Even with the domestic production, for the first four months of 1947, at an annual rate of 21,300,000 tons, demand for paper and paperboard is still greater than production. Some 3,700,000 tons of imported newsprint is expected to bring the overall consumption close to 25,000,000 tons in 1947.

Inherent in the mounting consumption of newsprint was the continued high level of newspaper advertising. Advertising lineage in fifty-two cities in the United States was 19 percent greater in January, 1947, than in January, 1946, and 41 percent greater than in January, 1941. Another factor in the increased consumption of newsprint was the increased circulation of both daily and Sunday papers. Net paid circulation of English language daily papers was reported to have risen by nearly 3,000,000 copies between September, 1945, and September, 1946, and still rising. Sunday papers, over the same period, increased their circulation by about the same amount. Compared with September, 1939, the circulation of daily papers rose by 11 million copies, and Sunday papers by 12 million copies in the seven year period.

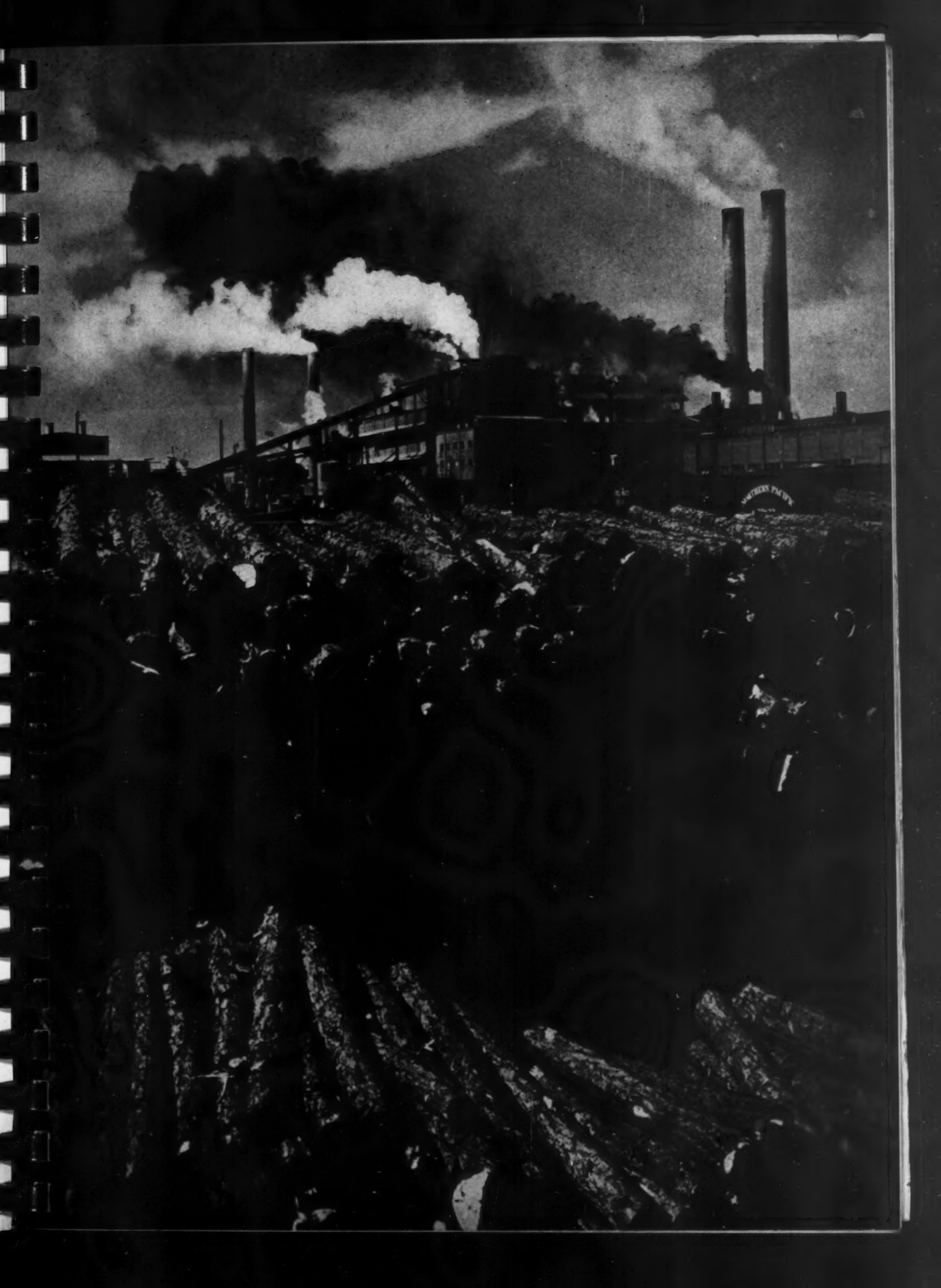
An increase of $6 per ton, in the contract price

(Picture, Opposite Page—)

(Courtesy, International Paper Company)

An Industrial Accomplishment

Steaming, Smoking, Busy Paper Mill, Backed Up with Ample Reserves of Pulpwood, and Long Lines of Freight Cars Waiting for Loads of Finished Paper.


SOUTHERN PACIFIC

of standard newsprint in rolls, was announced by Canadian newsprint manufacturers in the latter part of March, 1947. The new price, effective April 1, 1947, brought the "port" price for standard newsprint up to $90 per ton. This was the third increase in the price of newsprint announced within a period of eight months, and represented an increase of nearly 35 percent over the price prevailing early in 1946. Reasons given by the manufacturers, for this new increase, were the increased costs involved in getting out pulpwood, the rise in stumpage rates, higher rents, increased transportation costs, and the increased cost of coal and other materials and equipment.

In 1947, the production of groundwood printing, book and fine papers continued to reach new high levels. The integrated mills, with assurance of an uninterrupted wood pulp supply, were operating at capacity, or better. Operations of the non-integrated mills continued to be hampered by inadequate supplies of wood pulp. Production in both types of mills was hampered, somewhat, by the tight supply of some paper making chemicals, and slow deliveries of materials.

While production of printing and fine papers was higher than in 1946, it was still insufficient to meet consumer demand. Sulphite writing and book papers were particularly in short supply. Reported shortage was due, in part, to inadequate supplies of certain grades. For instance, there was a strong demand for text papers, due to the large backlog of orders for text books, built up during the period of controls. Confronted, on the one hand, with a strong demand, and on the other, with inadequate supplies of raw materials, manufacturers tended to concentrate on the higher priced grades.

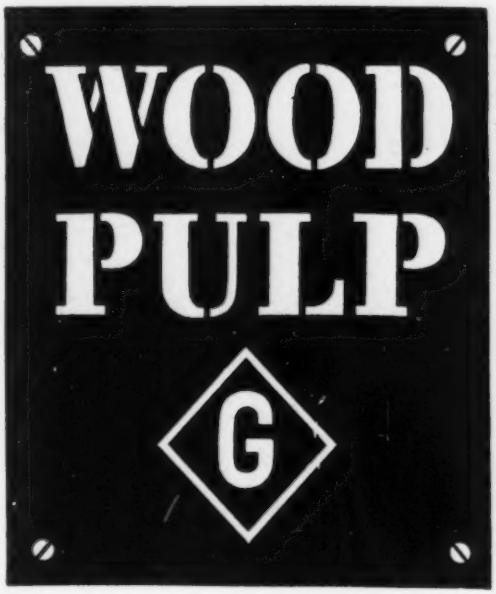
As in other grades, production of coarse papers maintained record levels in 1947. Yet, in spite of the high production, the mills were unable to meet the great consumption demand existing throughout the country. Merchants, in some sections of the country, used book paper for wrapping, because of the scarcity of the latter grade. Supply situation for sanitary, tissue, and absorbent papers continued tight in 1947. Reports indicated shortages of toilet paper, napkins, and towels, with available supplies of these items below the standard in quality, and priced from 30 to 40 percent above the 1941 level.

Despite the high rate of production of paperboard in 1947, demand continued well ahead, and, as a result, consumers of board and many of its products still felt the pinch. This was particularly true of the independent converters, who lost their former sources of supply for board through the sale of mills. Converters were further handicapped by the shortage of adhesives, dyes, and other raw materials. Rising trend in general business activity, and production in all lines, caused a progressive increase in the demand for packaging, and increased the demands made on paperboard.

The prospects for a continued heavy demand for paper and paperboard are based on several considerations. There is, first, a great demand to satisfy basic needs and uses, which vary in proportion to the level of economic activity. There is the demand arising from the new products, which the industry has developed in recent years, such as converting papers, building materials, and frozen containers, to mention a few specific items. There is the demand for further replacement of inventories depleted during the war. Then there are other demands, principally to speculative buying, and buying for export markets. All these demands for paper and paperboard have not been satisfied in 1947, although the gap in 1947 was much narrower than it was in 1945 and 1946, when requirements for paper and paperboard were at approximately the same levels existing through 1947.

Potential market for the consumption of paper, throughout the world, has hardly been touched. In the United States alone, the pulp and paper industry is nation wide, with plants in operation in practically every State. It currently pays annual wages of $366,000,000, has a capital investment of $2,290,000,000, and produces goods valued at $3,240,000,000. Its products in 1947 went to about 50,000 printers, and to about 200 major publishers, and was consumed by over 80,000 million people.

Established 1886



"Horizons of achievement stretch before us like the unending plains."

CORDELL HULL

So, too, the future for American papermakers: A limitless horizon.

Look back 75 years to a paper consumption *one-seventieth* as great as today's. Consider the vast amount of ingenuity, research and creative ability constantly developing an ever-increasing list of new products and new uses.

Paper serves mankind so well today — and always better tomorrow.

★

GOTTESMAN & COMPANY

— INCORPORATED —

22 EAST 40th STREET • NEW YORK 16, N. Y.

EUROPEAN OFFICES: Birger Jarlsgatan 8, Stockholm, Sweden

ESTABLISHED 1869 INCORPORATED 1912

HALLTOWN PAPER BOARD CO.

Successors to EYSTER & SON

Manufacturers of Paper Box Boards Mill Lining

Halltown, W. Va.

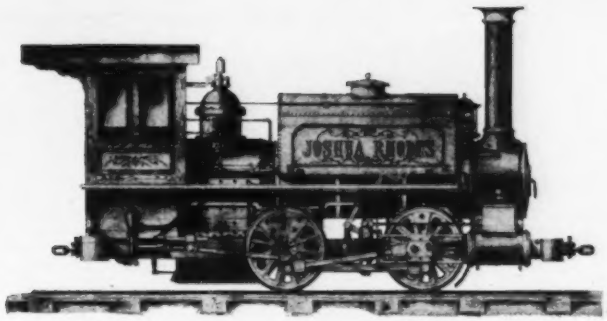
Located in the lower end of the Shenandoah Valley, on the B & O Railroad and U.S. No. 340, Sixty miles from Washington, D. C.

Was established in 1869 under the title of Eyster & Sons, and Incorporated in 1912, under its present title of Halltown Paper Board Company.

This is one of the oldest manufacturing plants in the state of West Va. and the oldest one, still in the same family which founded the business. Mr. Joseph Allison Eyster founded the business in 1869, and today, two of his grandsons are actively connected with the company as its officers.

Our present equipment consists of, one 72″ trim and one 60″ machine, modern steam and electric power plant, manufacturing various grades of Folding and Set-up paper box boards, and for more than 50 years, we have lined boards on the paper machine, by the Mill Lining Process, with various grades of lining papers, ie; Book, News, Litho, glassine, greaseproof, and other special papers.

Many of our present customers have been on our books for years, speaking well for our quality and service.



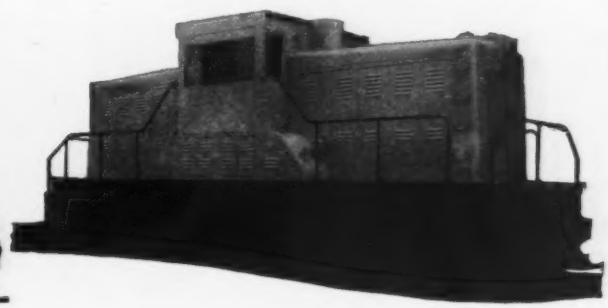
THE FIRST

PORTER

was 3 years old when PTJ was born

Porter locomotives have been in use for paper mill switching ever since.

30-Ton Porter Fireless Locomotive with 6 wheels for use on light track. An ideal switcher for paper mills because it operates on "stored steam" drawn from the mill's own stationary boilers.



65-Ton Porter Diesel-Electric Locomotive, twin-powered for light or heavy duty. Well-designed for intermittent or constant service, economical to operate and maintain. Other models in sizes from 20 to 80 tons.

PORTER BUILT means BETTER BUILT

H. K. PORTER COMPANY, Inc.

Pittsburgh 22, Pennsylvania

District Offices in Principal Cities

CASTLE & OVERTON, INC.

WITH ITS PREDECESSOR CONCERNS
SUPPLIERS FOR 69 YEARS
OF

MATERIALS FOR PAPER MAKING

Heritage Club edition of Arnold Bennett's *The Old Wives' Tale.* Paper by Mohawk Mills from Solka*. Text set by John Johnson, London, and illustrations by John Austen for the Limited Editions Club. Published by The Heritage Press.

COLLECTORS' EDITIONS
begin with the finest of paper

TAKE the Heritage Club editions of classics—our heritage from the past, the heritage of the future. Only the finest craftsmen were engaged, only the finest materials in book-making were used. The text of The Heritage Club editions of *The Old Wives' Tale, Wuthering Heights* and *The Pickwick Papers* is printed on the whitest of white paper made from Brown Company's Solka, a patented process, high Alpha pulp. This paper will keep its freshness for centuries. Here is one more example of Solka serving the needs of the most discriminating printers.

BROWN COMPANY

FOREMOST PRODUCERS QUALITY PURIFIED CELLULOSE

PULP SALES OFFICES: 500 FIFTH AVE., NEW YORK 18, N. Y. • 465 CONGRESS ST., PORTLAND 3, ME.
110 S. DEARBORN ST., CHICAGO 3, ILL. • 58 SUTTER ST., SAN FRANCISCO 4, CAL.
BROWN CORPORATION, 906 SUN LIFE BLDG., MONTREAL 2, P.Q., CANADA

*®

The New York and Pennsylvania Co., Inc. for 58 years manufacturers

of quality pulp and paper congratulates The Paper Trade

Journal on its 75th Anniversary.

The New York & Pennsylvania Co., Inc.

230 Park Avenue

New York 17, N. Y.

Mills at — **Lock Haven, Pennsylvania**

Johnsonburg, Pennsylvania

Willsboro, New York

THIS IS OUR 77TH YEAR!

GETZ BROS. & CO.

SAN FRANCISCO, CALIF.

Getz Bros. & Co., established in 1871, are one of the pioneer American firms in the export field. Operating through their own branches, they secure, without risk to U. S. manufacturers, foreign markets for their products.

Branch Offices

BANGKOK		HONOLULU
BATAVIA		MANILA
CANTON		PENANG
CEBU		SHANGHAI
HONGKONG	TIENTSIN	SINGAPORE

Special Agents

GETZ INDIA, LTD.

BOMBAY **CALCUTTA** **MADRAS**

Affiliated Companies

GETZ BROS. SOUTH AFRICA (PTY) LTD.

JOHANNESBURG **DURBAN** **CAPETOWN** **PORT ELIZABETH**

GETZ BROS. DE MEXICO, S. A.

MEXICO CITY

GETZ IMPORT CORP.

NEW YORK

West Virginia
Pulp and Paper Company

230 Park Ave.
New York 17, N. Y.

35 East Wacker Drive
Chicago 1, Ill.

Public Ledger Building
Philadelphia 6, Pa.

503 Market St.
San Francisco 5, Calif.

Manufacturers of West Virginia Mill Brand Papers

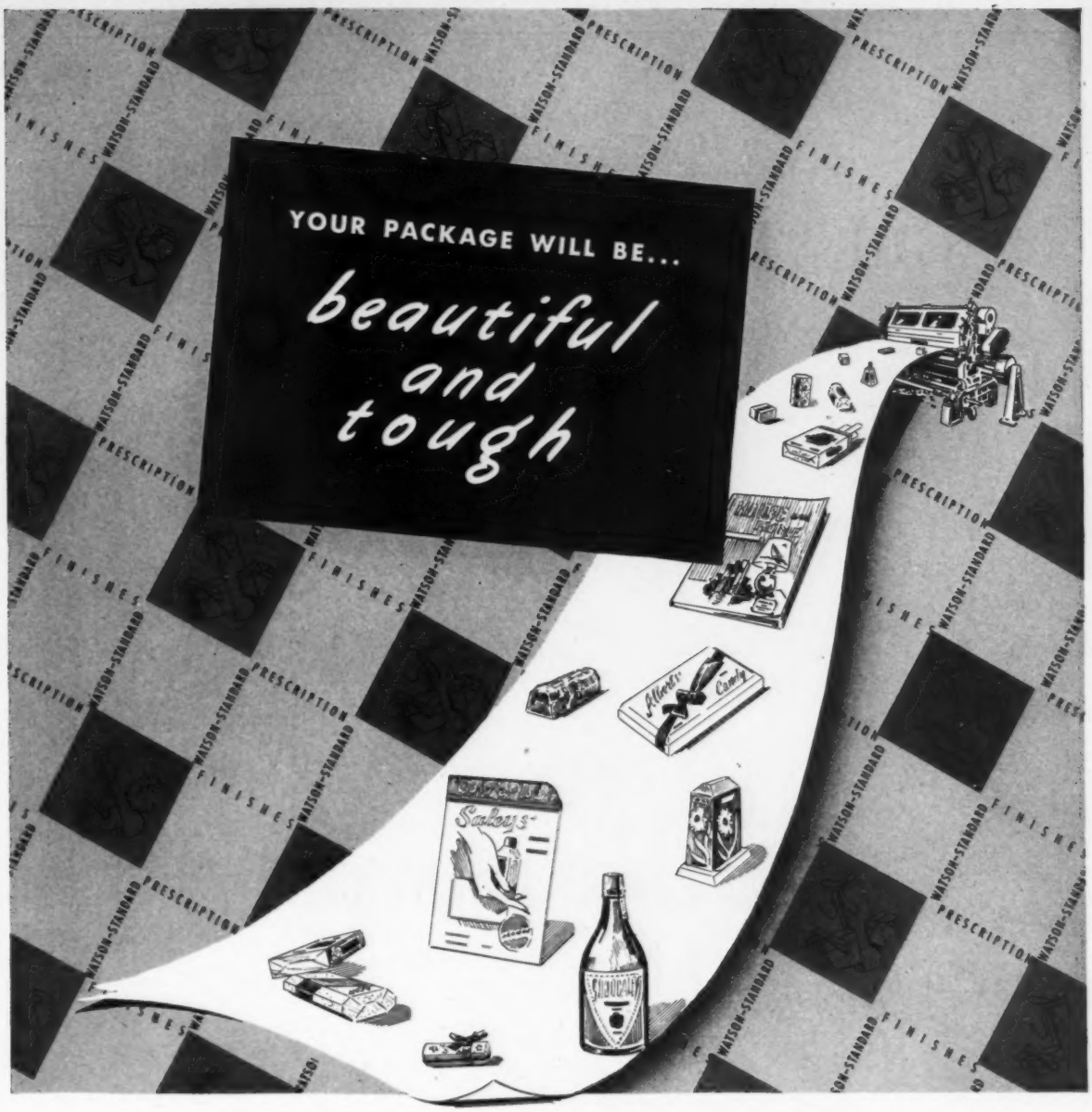
Supercalendered	Writing
English Finish	Envelope
Lithograph	Mimeograph
Label	Index Bristol
Offset	Post Card
Eggshell	Cover
Music	Cup and Container
Poster	File Folder
Bond	Tag
Coated	Machine Coated

Kraft Converting and Kraft Envelope
Kraft Liner Board

Mills

Mechanicville, New York
Luke, Maryland
Covington, Virginia

Tyrone, Pennsylvania
Williamsburg, Pennsylvania
Charleston, South Carolina



with a *Watson-Standard* coating

Your need for a paper or foil coating which is beautiful, durable and easy to work with can be furnished by Watson-Standard. Whether you require a coating which is chemically inert, water and weatherproof, non-toxic, tasteless, dull or glossy—whatever your requirements, Watson-Standard can produce the coating you want. Just give us your specifications and production processes and we'll supply the answer.

Write today for complete information.

TOUGH JOB HEADQUARTERS
Prescription Finishes
Give us your metal coating problem. We guarantee you an answer based on your conditions, and not just a standardized formula.

THE WATSON-STANDARD CO.

Manufacturers of
PAINTS • VARNISHES • INDUSTRIAL FINISHES AND LITHOGRAPH COATINGS

FACTORY AND GENERAL OFFICES: PITTSBURGH, PA.
WAREHOUSES: BOSTON, BUFFALO, DETROIT, NEW YORK

GREAT LAKES SALES CORP.

MILL REPRESENTATIVES

PAPER

PAPER SPECIALTIES

M.G. and M.F. Sulphite Wrapping, Decorated Wrapping

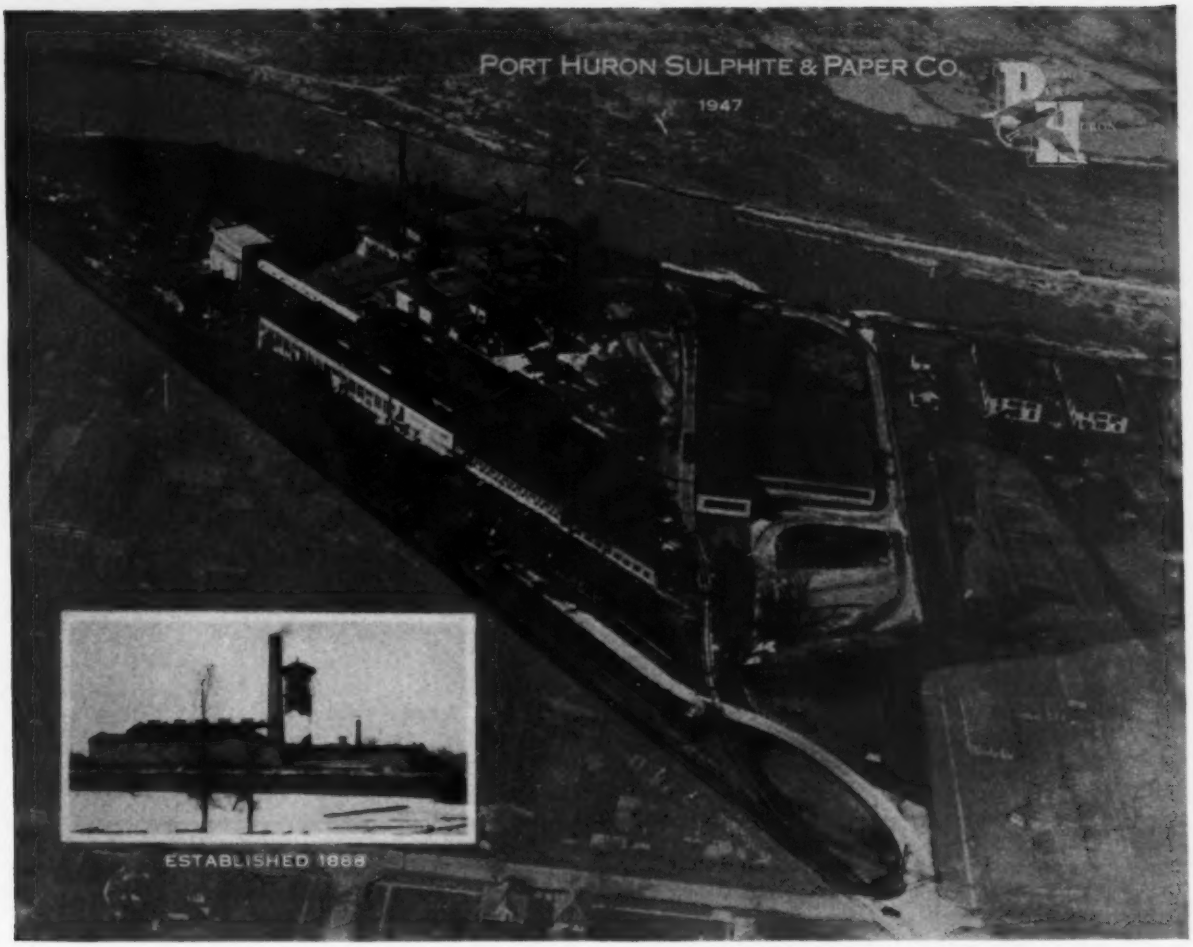
Newsprint, Manifold and Converted Specialties

CHICAGO

332 South Michigan Avenue

NEW YORK

52 Vanderbilt Avenue



Manufacturers of Printing Papers,

Converting Papers and Converted Paper Products.

PORT HURON SULPHITE & PAPER COMPANY

Port Huron, Mich.

New York 17, N. Y.
424 Madison Ave.

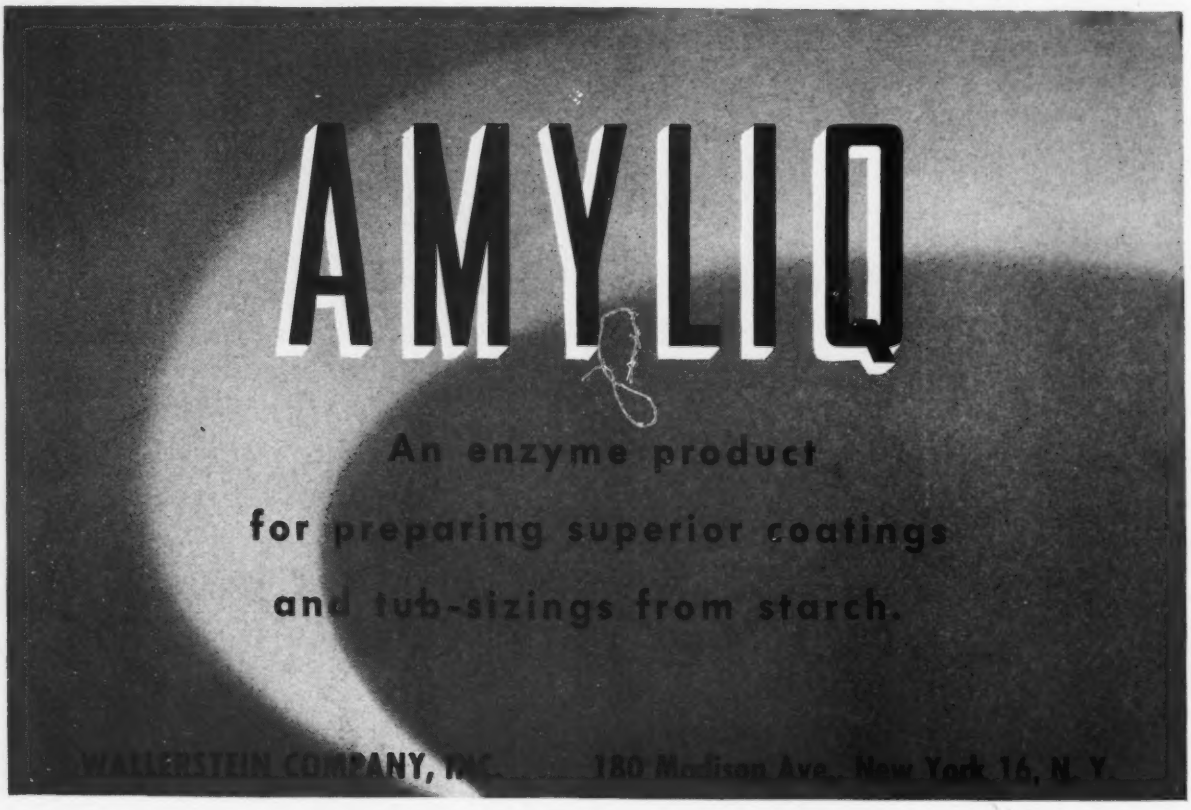
Chicago 6, Ill.
400 West Madison St.

San Francisco 5, Cal.
461 Market Street

The
CLEVELAND PAPER
Company

1640 SUPERIOR AVENUE • CLEVELAND 14, OHIO
CHerry 4490

Local Sales Offices
AKRON, OHIO • YOUNGSTOWN, OHIO • JAMESTOWN, NEW YORK



TO PROMOTE

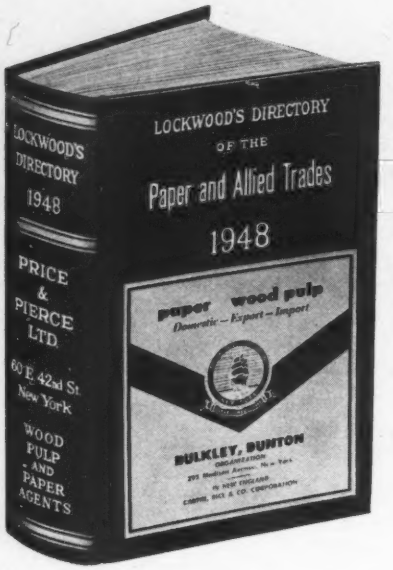
BETTER RELATIONS

BETWEEN

MERCHANTS AND MILLS

PAPER & TWINE ASSOCIATION

Hotel Sinton, Cincinnati, Ohio



THE SEVENTY-THIRD EDITION

Lockwood's Directory

OF THE

Paper and Allied Trades

The Guide to the Paper and Allied Industries
Issued Annually Since 1873

Regular Edition or Traveler's Edition
$10.00 or $9.00—cash with order

CONTENTS

PAPER AND PULP MILL SECTION

Geographically arranged by states

Reports of the paper, ground wood pulp and chemical fiber mills located in the United States and Canada.

These reports include name of company. Location of mill. Names of officers and operating executives.

It is indicated whether the plant is a paper mill, ground wood mill, sulphite, sulphate, or a soda pulp mill.

Type of mill equipment. Kind of power used, whether water, steam or electricity.

Shipping point, Railroad siding, Post Office, nearest Bank, Money Order, Telegraph Office, Telephone Number, U. S. and State Route Numbers. Canada: Kings and Provincial Highway Route Numbers. Population.

KIND OF PULP AND PAPER manufactured. Total production in pounds per 24 hours.

MILL OFFICIALS—Alphabetical list of 4831 mill officials and executives including their connections.

Reports of the Paper and Pulp Mills in Cuba, Mexico, Philippine Islands, Puerto Rico, and South America.

Glazed, Coated Paper and Board Manufacturers.

List of idle mills in the United States and Canada.

ADDITIONAL MILL INFORMATION

PAPER AND PULP MILL OFFICES in a few of the leading cities in the United States and Canada. 555 in this list.

MILL PRODUCTS—Arranged in alphabetical order. 375 different classifications of products made.

RAW MATERIALS—Classified and arranged in alphabetic order. The kind and grade of paper stock and rags consumed by the different mills including names of the purchasing agents.

PAPER AND PULP MILL MACHINERY, EQUIPMENT AND SUPPLIES—A classified (alphabetical) list of 1467 different kinds of machinery, equipment and supplies used in the pulp and paper mills including the names and addresses of 1542 manufacturers.

CONVERTERS' SECTION

Manufacturers of Paper Specialties

1479 Manufacturers . . . 673 Classifications of Products Made.
A classified list (alphabetically arranged) of products made from paper, cardboard, etc., such as drinking cups, mailing tubes, napkins, toilet paper, towels, wrapping specialties, etc. The name and address of the manufacturer is included.

Separate Lists of Concerns

(Geographically arranged) manufacturing the following products:
ENVELOPES—249 Concerns manufacturing commercial envelopes. Only concerns operating machines are included.
PAPER BOXES—1498 Manufacturers keyed to show whether stiff, folding or corrugated boxes are made, also whether suit, millinery, confectionery, etc., etc.
PAPER BAGS—254 Manufacturers of paper bags and sacks.
PAPETERIES—109 Selected manufacturers of papeteries.
PREPARED ROOFING—43 Manufacturers.
TABLETS AND PADS—162 Manufacturers keyed to show those engaged in other lines.
TAGS—65 Selected manufacturers.
TWINE—132 Manufacturers of twine from cotton, jute, hemp, etc.
VEGETABLE PARCHMENT—7 Manufacturers of genuine vegetable parchment.
WALL PAPER—58 Selected wall paper printers.
WAXED PAPER—114 Manufacturers.

ADDITIONAL SECTIONS

PAPER DEALERS—2966 Paper Merchants, geographically arranged and keyed to show the * General Paper Dealers who Maintain Stores. † Member National Paper Trade Association. s Dealers who sell from Storage, Warehouse or from Mill direct. sl Merchants in other lines who carry paper as a side line. b Brokers. br Concerns that are Branches of Houses located elsewhere. f Fine Paper. w Wrapping Paper. f.w. Fine and Wrapping Papers.
RAGS AND PAPER STOCK—757 Dealers in rags and paper stock who sell raw materials to the paper mills.
WATERMARKS AND BRANDS—Approximately 15,000 watermarks and brands used in the American paper trade—alphabetically arranged. Names of owners are included. This list is restricted to papers of various kinds—converted products are not included.
ASSOCIATIONS—Reports of 156 Trade Associations in the paper and allied industries with names of officers.
PULP TESTING CHEMISTS—WOOD PULP IMPORTERS—STATISTICAL INFORMATION

LOCKWOOD TRADE JOURNAL COMPANY, INC.

15 W. 47th ST. **NEW YORK 19, N. Y.**

"Practise makes perfect." Thorough experience sometimes makes difficult tasks seem mere routine. To produce coated paper of precision uniformity and quality is a highly technical art for which the Cantine paper-coaters of Saugerties are well qualified by reason of their background of sixty years devoted to this one thing.

THE MARTIN CANTINE COMPANY
SAUGERTIES, N.Y.
Specialists in Coated Papers Since 1888

Cantine's Coated Papers

Leatherneck

Kraft Papers

Crossett Paper Mills—Crossett, Arkansas

General Sales Office—Crossett, Arkansas

Branch Offices:
1816 First National Bank Bldg., Cincinnati, Ohio
1037 Paul Brown Bldg., 818 Olive St., St. Louis, Mo.

CHAPTER XII

'Rags-to-Riches' the Story Of the Making of Pulp

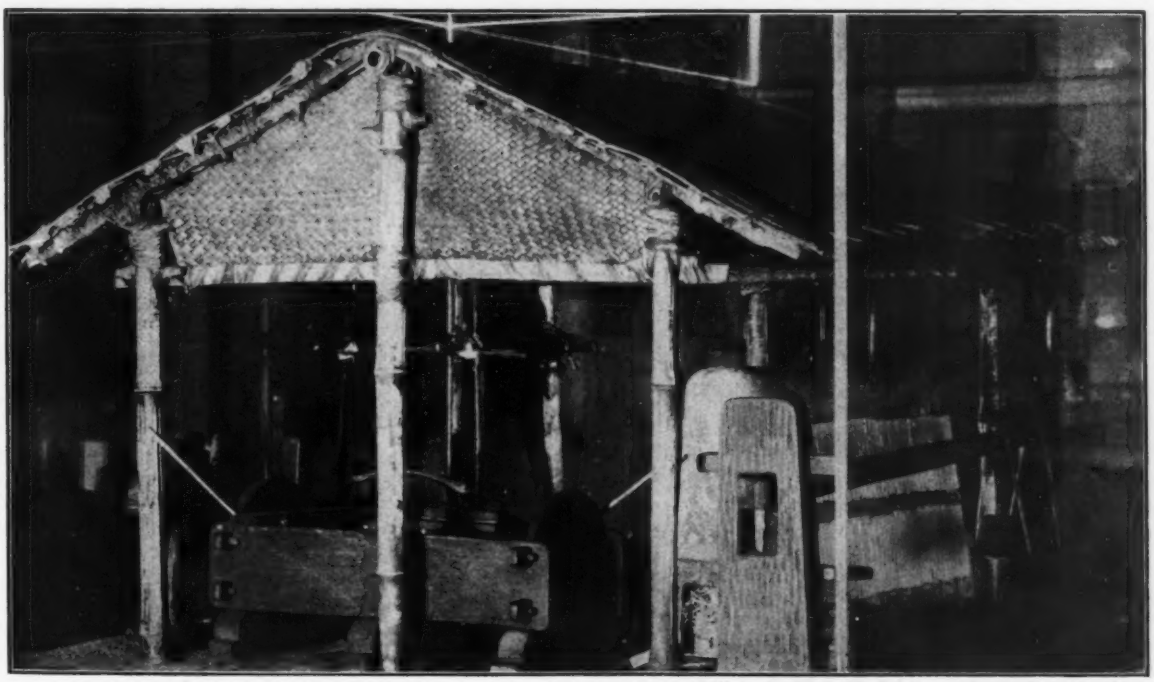
IF A BYGONE boys' writer, Oliver Optic, had been assigned the subject of "Pulp" he would have undoubtedly titled it "Rags to Riches." His books, "Sink or Swim," "Survive or Perish," and so on always indicated that he had in mind a quick repetitive or alternative title, something to swing along with the story. So "Rags to Riches" might indeed be the story of pulp if only rags alone had been used through the years. Rags, their proponents have insisted, make the best paper. But less costly, less scarce, material had to be found. So, over the years, almost uncounted items of paper supply have been turned into pulp. Papyrus and parchment had nothing to do with modern pulp. Yet they both set the style, the pace of pulp for paper. Something to write or print upon, something to endure. And something easily obtained, something cheap.

About the year 95, A.D., perhaps the first mention of pulp was made. It has previously been related in this "Progress of Paper," that du Halde reported mulberry tree bark was used for pulp in China. Also, that rags and hemp were used, as well as the remnants of silk from the industry of the mulberry worm. Coming out of China, as we have previously observed, were sheets of paper a dozen feet in length, some more remarkable, even though still supported by useful Oriental bamboo.

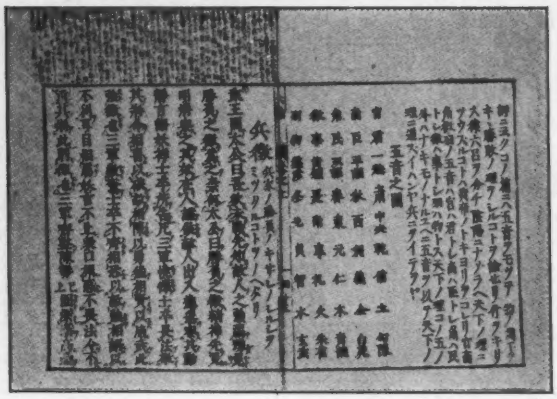
Koreans made paper of about the same materials as the Chinese in the first cenutry. Even the Romans, somehow, were using paper of tree bark in the third century. Paper was repeatedly paid as indemnity to the Romans, and even the Egyptians neglected their papyrus and parchment to obtain and use paper at Alexandria in the same cenutry. They failed to say of what this paper was made, but it was commonly believed, in the east and in the near-east, as

Model of Primitive Indo-China Mill

A scale model of a primitive paper mill in Yen-Thai, Tonkin, north Indo-China. Mills of this type are in operation at the present time, in Indo-China, and have been in use for the past seven hundred years. Much of the paper formed in these mills is used by the native people in religious ceremonies.



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology.)



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

From a 300-Year Old Chinese Book

Two pages of a Chinese stitched book from the period of Shun Chih (1644-1662). Top margins were left wide, so the reader could inscribe his note. This plan was also adopted by European printers; but, in the books of Europe, the widest margins were at the bottom of the pages

well as in southern Europe, at this time, that paper was made from the pulp of rags, mixed with various other vegetation, as it might be conveniently secured.

Better and thicker paper came along down the years, until, in the middle of the fifth cenutry, Proteaux has observed that papyrus was becoming obsolete, and that paper, from pulp, was taking its place. In Italy, and even in Spain, paper from pulp was noted. Longobards, for their famed imperial ukases, used paper made from bark at the beginning of the seventh century.

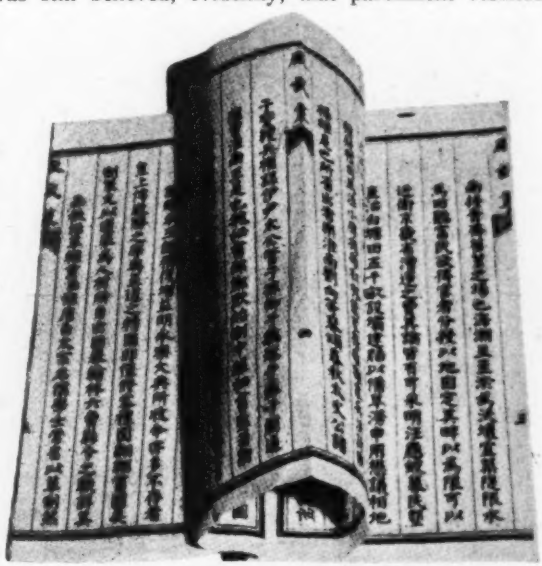
Mulberry bark in Japan still made excellent paper in the seventh cenutry. It developed into a large industry, and, even today, of course, Japan is noted for its paper products, from paper fan to paper housing. Chinese origin of paper, a local State secret, was followed by the Arabic use of pulp at Samarcand, a paper product center then in its early primitive state. Cotton, for pulp, was a development of Tartary, from whom the restless and combative Arabs acquired it, during the war and economic pressure.

Pulp paper of cotton was used by the Popes of Rome in both the eighth and in the ninth centuries. It was commonly designated as charta bombycine, or cotton paper. Churches used it gingerly, as they believed nothing could take the place of papyrus nor of parchment for durability. When church inventories were accomplished, the plan was to use the suspicioned cotton paper only for temporary accounts, while the more permanent parchment was used by the monks for timeless records. In the beginning of the eleventh century, however, records were written on cotton paper. Museum specimens still exist. Libraries have ancient manuscripts, of that time, written on cotton paper, but the dependability of cotton pulp was not regarded so substantially as that of the previously mentioned parchment.

In Spain, the progression of paper from pulp was more remarkable, even though still unsupported by both Church and State. In the closing days of the eleventh century the Moorish paper makers were busily engaged in pulp production for their limited hand mills. But the Spaniards did it better. Instead of using the usual raw cotton, brittle and yellow in paper, after a time, the Spaniards used all the rags they could obtain. It was then generally named parchment cloth, from this processing.

Linen paper, from Arabia, has been found, dating from the tenth and eleventh centuries. But the State or Government documents still required parchment in Europe. Sicilian kings doubted the worth of cotton stock, and stuck manfully to parchment for their edicts. Lots of cotton was grown in Sicily, at the time, but the King had small faith in it for paper. Xativa, in Spain, as previously mentioned, became a center for cotton pulp production. It was whiter than that generally in use. Raw cotton and rags were mixed, but the Spaniards favored rags. Finally, though, in 1178, A.D., a treaty of peace was at last signed by the kings of Aragon and Castile, and the document was made of linen paper. Hemp and flax had been used in Spain by the Moors, as cotton was none too plentiful there. Specimens of manuscripts on cotton and hemp paper still exist in Spain, written originally in the eleventh century.

In its slow progression into Europe, poor cotton paper found its way at last, into Germany. But the ruling houses forbade its use for public papers. It was still believed, evidently, that parchment resisted



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Chinese Stitched Paper

Stitched book of China was an outgrowth of the folded book. This specimen is one of two copies printed in the Imperial Palace, Peking.

the wear and tear of time, while cotton pulp paper was transitory. In the twelfth century, linen rag paper was used in the German States. Both France and England used a bit of pulp paper in the closing days of the thirteenth cenutry. Mills were built in Germany toward the close of the thirteenth cenutry, but exactly what was their processing has been lost in the mists of matter.

In the quest to establish an origin date for linen paper much investigation has been made in Europe. But it is still somewhat of a mystery. Claims and counter claims were, and are, frequent. France, Germany, Spain, Italy, all claimed priority. Into the fourteenth century some original manuscripts bore evidence of both cotton and of linen rags. Edward III was supposed to have been 14 when English papers were written on linen pulp. Even Italy had been minus a mill until approximately 1330, A.D. So it is believed all previous Italian paper came from the near east, or from Greece. Spain was making paper before that, evidently, but it had been of poor quality until the Government demanded improvement. At least, the command was to "restore the production to its previous quality."

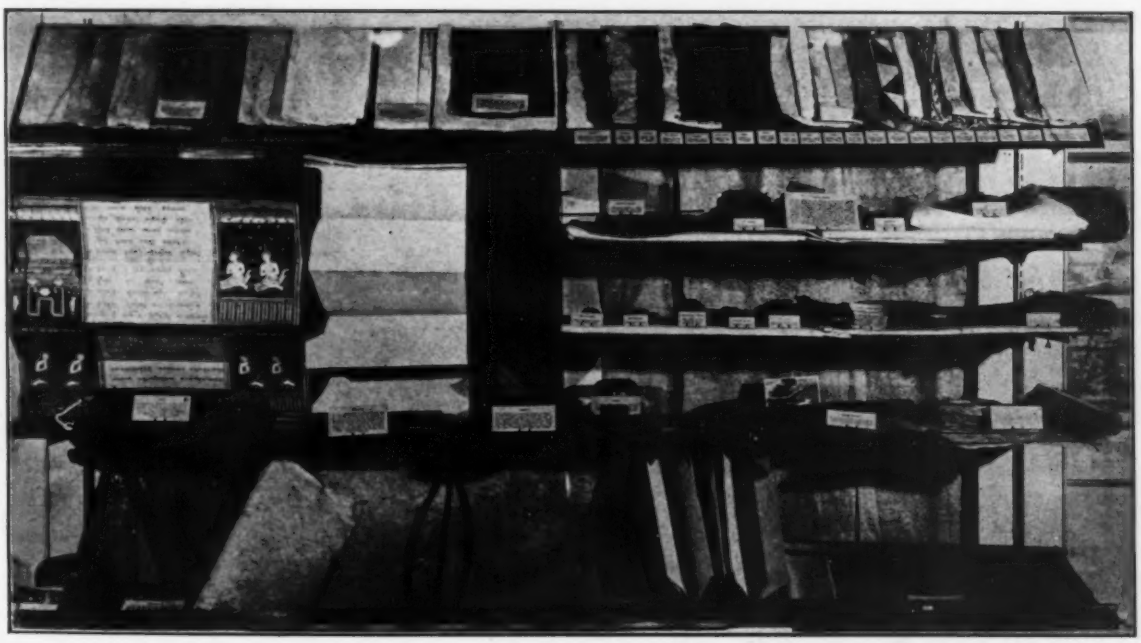
Only coarse paper came out of the Spanish mills, as a rule. It was made of cotton, too, but Spaniards liked to call it "linen." They persisted in this, much to the disdain of neighboring consumers. Production was slowly spreading in Italy, and some better hand made paper was made. It was exported to France. But France built its first mill about 1340 A.D. Linen paper appeared in Britain, too, but its source was unknown. Fabriano, in Italy, with several mills, stuck to cotton pulp. In Germany, a superior name was given an inferior paper. It was called Greek Parchment, made of cotton. It rather appears that the Germans were about the first to see the advantage of a paper trade name, or classification.

Linen rags were used in Austria, also, in the middle of the fourteenth century. Baden was the place, and that established a long life to paper production in that locality, as it was as late as the inauguration of the PAPER TRADE JOURNAL in 1872 that Baden was still making paper machinery and equipment.

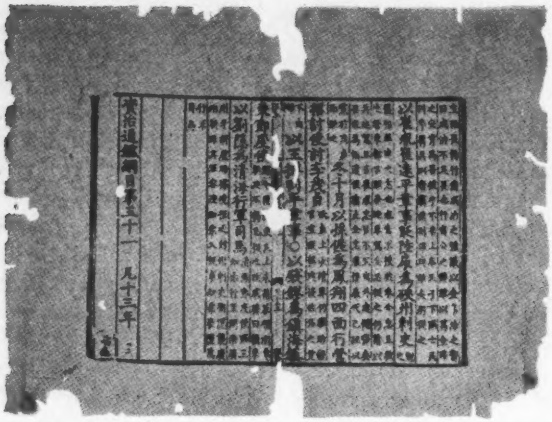
Pulping material was evidently becoming scarce in Italy in the fourteenth century, because an act was legally established to prevent exportation of linen rags in 1366, A.D. Venice was the place for that production, and it is about the first record of the soon to be general scarcity of raw material. Greeks had

Papermaking Tools of Siam, Burma, Indo-China, the Islands of the Pacific, Mexico, and Central America

Primitive papermaking tools and papers, formerly used in Siam, Burma, and the South Pacific Islands. The long, narrow mould displayed in the bottom of the case, to the left, is from Bangsoom, Siam, and was originally used in forming sheets of "khoi" bark paper to use in the Siamese temples for religious writings. The mould is capable of forming paper about 61 by 60 inches is size. This mould is of the "wove" pattern, being composed of hand-woven cotton cloth. The "laid" mould, at the right, is from Lang Buoi, a great papermaking center near Hanoifi Tonkin, Indo-China. This mould was formerly used in making ceremonial papers, measuring about twelve by twenty-four inches. Material used in Indo-China, for making paper, is the bark of the "Daphne," also bamboo.



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Chinese Paper Nearly 1,000 Years Old

Two pages from a Chinese book dating from the Sung Dynasty (960-1126). Paper is made from bamboo and mulberry bark fibers.

brought paper making to Italy. They used cotton, of course. Carried by war, the Saracens were the direct means of making the industry a success in the Roman States. Coming down the centuries has been the established reputation for magnificence in production of Bodoni. He made his first name at the Fabriano mills, early in the fourteenth century. Reputation like that is enduring. Even our type faces, today, bear that trade name.

If the Germans were pioneer producers of rag paper in Europe, as they claim, the establishment of the Stromer mill in 1390, A. D., was probably the first evidence, to hand, of rag stock in northern Europe. Counter claims to this statement, however, have been freely made throughout Europe.

It was in the seventeenth cenutry that mills started to make pulp of all sorts of things. Asbestos was one of these items. But the quality of the average sheet was poor. It was of all colors, shades, tints, taking its cue from the mixture of colored rags, or whatever the raw material might be. In England, along in 1688, A.D., very little except a crude brown paper, much like wrapping, was made. Some mills produced grey, dark papers, hardly desirable for either printing or for writing. Yet the price of it in England, for example, at this time, was enormous. Printing practically ceased, correspondents wrote as few letters and documents as possible.

Perhaps the first decent paper for writing in England was of French origin. And, when the Hugenots came over to England, about the end of the seventeenth century, the first really good English writing paper was made by these industrious immigrants. It was whiter, anyhow, though coarse.

When the new and first American paper mill was built in Pennsylvania, near Philadelphia, in 1690, A. D., by the famed Rittenhouse, the pulp was of linen rags. Much flax was raised in that area, and the wearing apparel for women, particularly, was of local origin. Hence, the rags. But "Rags to Riches" was hardly the theme of the paper mill at that time. Not in England nor in America. For the very poorest of families were engaged in paper production, both across the ocean and here. What would be called tramp mendicants, today, were not only paper makers, but even mill owners, as the capital required was small, and the profits even smaller.

Blue paper was made near Germantown, Pennsylvania. It was blue because no way was known to bleach it. Some fairly white paper was made, but this appears to have been more or less an accident, as no way appeared to have been known to make it white, nor to keep it so.

About 1719, A.D., as the eighteenth century swung into more advanced paper production, the almost fabled story of Reaumur came forth. He wrote that pulp could be produced from wood, because he had observed the wasp making its nest of pulp taken from trees. If a wasp could do it, why not man? But this essay on the subject seemed to fall on closed ears. Nothing immediately came of the Frenchman's

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Eleventh Century Chinese Paper

A mansucript on paper written in the characters of the Hsi Hsia tribe, based on Chinese caracters. Paper is made of mulberry bark, dating from the eleventh century, and measuring approximately 24 by 32 inches.

observations. But the story interested many thinking men. Its eventual use, in practical pulping, was not so far off as some men appeared to believe.

Andalusia was famous for its rag content in the early days of the eighteenth cenutry. So famed, in fact, that Italians took advantage of it. They came to Spain, bought the rags, and eventually returned to sell the completed paper to the Spaniards. That's business.

Asbestos again came to the front as pulping in the advanced stages of the eighteenth cenutry. But it didn't seem to stick. Books were made of the paper, but the roofing people had not yet come along to use it properly. In both Germany and in this country additional efforts were made to popularize the material, yet without financial success.

Massachusetts appeared to be coming to the very front ranks of writing paper production along in 1728, A. D. Colonial rights were granted in the Commonwealth, so that writing paper could progressively be made better and better, through grant of a ten year control. But all that was required of the mill was 500 reams annually, of both writing and wrapping paper, which was still of the standard, or substandard, brown. This mill was at Milton, and took two years to build and to start operation. Daniel Henchman was the proprietor, and it was thought to be the first mill in the colony.

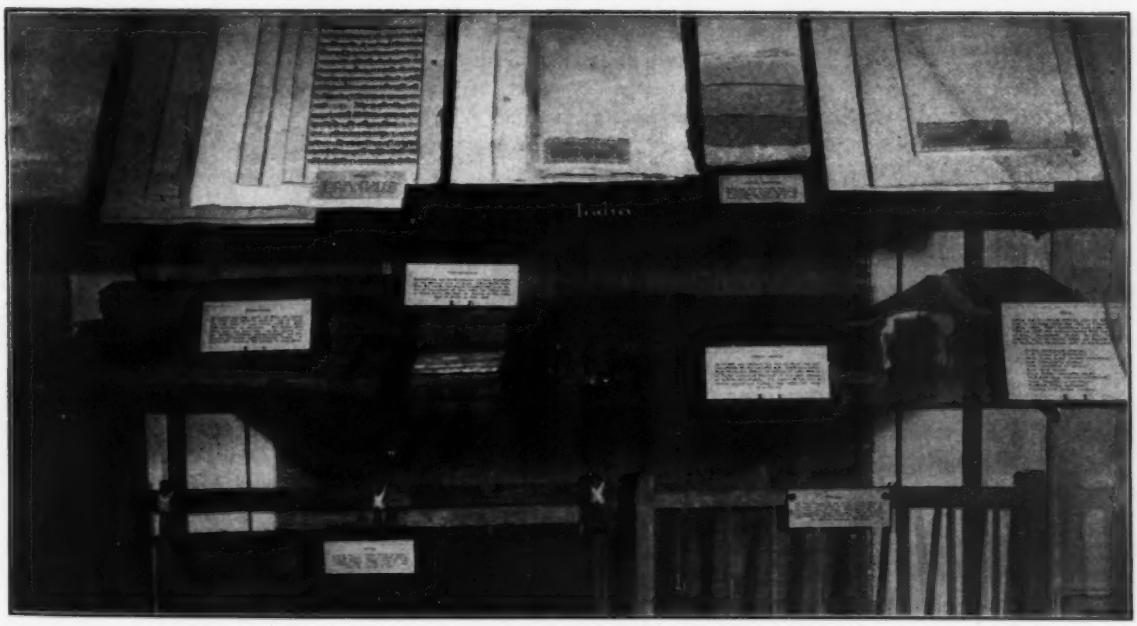
Rag merchants were springing up almost everywhere. As in Europe, the demand for rags was prodigious, and becoming ever larger and larger by the demands of both printing and correspondence, as well as by packaging, then in very crude form of mere common wrapping. Advertisements appeared in the Boston newsprints, asking householders to "save" their rags. By this method one merchant alons accumulated 7,000 pounds of rags, then thought to be a decided accomplishment.

In Flanders a naturalist, Seba, wrote that the country was full of trees to make pulp for paper, but that the industry did not seem to appreciate the fact. He suggested several types of trees suitable for pulp, all local lumber. And a man in Holland finally invented the first pulp engine in 1760, A. D., to more quickly reduce rags to the mass. And, as usual, few people paid any attention to this new cylinder at all.

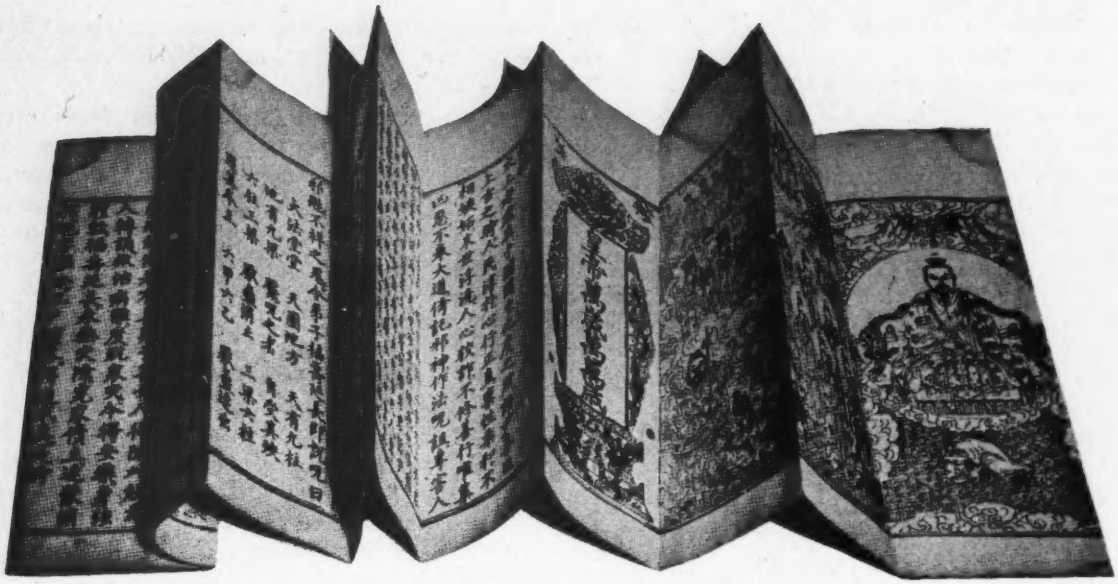
Guettard, in France, about this time, advocated several types of vegetation for pulp. He suggested bark, leaves, timber from various kinds of trees, shrubs, in his work on the subject. From Holland, too,

Paper and Paper Moulds from India and Tibet, Inclusive of Laminated Paper Used for A Persian Falcon Coffin.

Handmade papers, and the moulds used in their formation, as practiced in Bengal and Hyderabad, India. On the middle shelf of this exhibition case may be seen a falcon's coffin, made entirely of laminated paper, a process thought to be of recent development. This coffin, of Persian origin, dates from the eleventh or twelfth century, and is constructed in much the same manner as laminated paper is made today. The Paper Museum possesses original documents, proving that ocean-going ships were actually made of laminated paper as early as 1788. Also in this display case will be seen pasteboard, made in Tibet in the fifteenth century, as well as paper formed by prisoners in the jails of India during the eighteenth and the nineteenth centuries.



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Chinese Folding Book, Printed on Paper from Wood Blocks

Folding book was originated by Chinese in the tenth century, and consists of simply creasing or folding a rolled scroll into sections. This type of book came into use after the invention of paper, and after the original use of woodblocks in printing.

went Dutch workmen to Austria to show the Queen's subjects how to make paper. She, Maria Theresa, of more than local fame, abolished the monopoly on the purchase of rags.

Scientists were still struggling with the origin of linen paper. They offered many prizes for facts. And they got, them, mostly wrong. Everyone claimed to know where and how linen paper was first made. And everyone was disappointed in not winning the money or medals of precious metals.

In America, along in the middle of the eighteenth century, no pulping cylinders or engines were used as yet. Rags were still pounded by hand into pulp. That was the good, old fashioned way, and the usual argument of "what was good enough for grandfather is good enough for me," prevailed.

Straw paper was coming along about this time. Its first production evidently came from Germany, where straw was more plentiful than either cotton or rags in any form. Rags were extremenly scarce in the German States. And the Germans, cleverly, were finding ways and means to bleach the straw. Hollanders, or pulping engines, were coming into use slowly, and the hand methods were at last giving way to a decided betterment in production of pulp.

Now, again, as the century was approaching its end, attempts in Germany were made to use sawdust, moss, beach, willow, aspen, mulberry, clematiteo, pine, hop and grape vines, hemp, mothwort, barley straw, cabbage stumps, thistle stalks, burdock, wheat straw, broom corn, peat—in fact, anything at all which could be reduced to pulp. But most of the suggestions were never carried out, being written down by naturalists, as a rule, for whom the practical paper maker had very small regard.

Rags were still in great demand in New England in the closing days of the eighteenth century. Bell-carts were used to attract attention, to get people to come into the streets and offer their rags. Newspapers carried advertising to that effect, and the response was very good again. Mills in America and mills in Europe struggled for rags. Germans needed them as badly as Americans. Nine-tenths of all German mill stock had to be imported. Schaeffers, in Germany, continued his experiments with all sorts of mill stock, printing a book on the subject with sixty specimens of paper made from various kinds of vegetable pulp. And it was the German Scheele who finally found that chlorine would bleach paper in use with lime. But people failed to support the mills with sufficient rags. In America, at the outbreak of the Revolution, demand for paper greatly increased, and everything that could be ground up into pulp was used for stock.

Linden paper appeared in France the year 1776 that the American Revolution had progressed far enough for the Declaration of Independence to be written. It was called basswood, but the venture was far from a success. Cartridge paper was in such great demand that several American colonies set up bounties for mills producing it from anything at all, rags included, if possible. In Massachusetts, commissioners were appointed in each town to receive rags. Holland continued to excell in production of fine writing paper, and even France, which made some very fine stock, now sent paper makers to Hol-

land to find out exactly how the Dutch did it. One secret: they had lots of good rag stock.

Cartridge paper in the colonies was again in such demand that committees of safety seized all paper stock obtainable. It had to be thin, strong, pliable, inflammable—and such a combination was difficult to obtain, in America, particularly. Reason, again: insufficient rags.

Meantime, very fine vellum paper was being made in England. As the American Revolution closed, considerable of this fine stock was made in France, and it was known as papier velin, similar to parchment, minus water marks. Good stock had to be found for such paper, and Americans had been so busy with their own affairs that they had little time to experiment with such paper, nor did they have sufficient rags to make it. Paper was extremely scarce in all parts of the new United States. In New York, insufficient paper could be found for printing.

Hamburg, in the German States, was making a dark purple paper, at that time, for bakers. More than 60,000 pounds of rags were required to do it each year, so the wrapping of buns was of more importance than even the production of better paper, which, in America, would have been made from such a great supply of rags. But the rags of southern Europe were once more famous. It seemed that everyone again had rags. While Americans struggled for pulp stock, carrying it great distances by pack and by cart, the mills of Europe appeared to have all they wanted about this time.

Again did the tremendous variety of tree and shrub material come to the front in those particular countries minus sufficient rag stock. They were ground into pulp, but the paper makers were still suspicious of anything but linen and cotton rags. As the eighteenth century drew to a close even English mills were experimenting with bark and leaves, especially with willow twigs. Sallow trees were used in France. Ten cents the pound was paid for hand made paper by the French, but they continued to insist on rag content. Bluing of pulp commenced about this time, and the completed paper brought a better price.

To solve the shortage of rags in countries without them, much paper was made very thin. In Germany, the paper was so thin that printing could be done upon it only with great difficulty. Englishmen were finding new ways to bleach pulp, using the methods employed in bleaching cotton thread.

In New York State, as the colony passed from British to American control, a great surge of enterprise induced the establishment of new, though small, paper mills. But rags were such a problem that three pence was paid for clean white stock, two pence for assorted colors, and less, according to grade, by the pound. Women were appealed to; they were asked to lay aside all their old cotton or linen clothing. But an enterprising Vermonter (then still part of New York) made pulp from basswood for wrapping paper, like the French.

One rather original idea in the bleaching of pulp came from England. Rags were bleached, so they said, with sea salt. But it took an American of

Moulds and Paper from Persia, Kashmir and Nepal

Papers and the equipment used in their making from the various papermaking provinces of India. Moulds shown in this photograph are from Kashmir and the Punjab, where dried grass is used in forming the "laid" lines of the moulds. The examples of paper are from Kashmir, and show the several stages of development in the making of the elaborate manuscripts written by the cleverly learned Kashmir calligraphers.

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

17th Century Hand Mill

Complete process of forming sheets of paper, showing the vatman, the "coucher" and the layboy at work, as depicted in a wood-cut from the latter seventeenth century. Original is colored by hand in a most careful and painstaking manner.

French decent, to make pulp out of frog spittle. That was in 1800, just at the turn of the nineteenth century. Straw paper came into some use in England, about this time. And waste paper began to be used as pulp in England, too. They used all kinds of waste, inclusive of printed paper. Russia, entering the paper picture in a small way about now, used rags to make wall paper, then called "paper hangings." Plenty of rags appeared to be available in the land of the czars. But the ukases of the Moscow Government forbade their exportation.

Matthias Koops, always experimenting with new pulping, found that he could use wood, about this time. He also extracted the ink from waste paper, and was the first, evidently, to use such waste for new stock. He claimed to have been the first to use straw for paper, but this has been amply challenged from many sources.

In France, about now, the use of rags and other substances had reached fully twenty million pounds annually. But the French were more liberal with rag exports, and sent fully fourteen million more pounds abroad. This was forbidden, but the usual black market appears to have operated full force. Thousands of Paris and other large city guttersnipes made a more or less peculiar living by gathering street rags for pulp.

In the United States, again, attempts were now made to get more rags. It was said that citizens of Massachusetts and Connecticut were better trained to preserve their rags, but that York Staters failed to cooperate with the mills. It was also said that original Yankee ingenuity, in Connecticut, at least, had induced the thrifty housewives to put fine work bags, even in their parlors, with the intent of placing rags therein. When the ragman came around he paid not only pennies per pound, but also distributed tin whistles for the children, houseware for the wives, tobacco for their husbands. To the rag man who offered the largest tribute, of this kind, went the prize in the parlor rag bag.

One of the inducements made in New York was that books could only be obtained by people who saved their rags. And that education would, indeed, fail for the young unless rags were preserved for books and the paper whereon which to write. Servants were accused of sweeping the rags into other waste, and even burning them. But occasional epidemics scared the people, as rags from "consumptives" (tubercular patients, of which there were then many), and of diphtheria, then "lung fever," were dangerous to the public health, thus unsuitable even for pulp stock.

In England, again, a method was found to color the pulp with various vegetation, such as bran and hay. Husks of Indian corn were used for pulp in this country, but Europe, not knowing of Indian corn, failed to appreciate its use. England, also facing the continuous rag problem, was bringing 3,111 tons into the country at the opening of the nineteenth century. For probably one of the first times in the history of publicity, then crude, billboards were used in England to advertise that £60,000 were paid every year for imported rags, and that ladies of the realm could thus enrich their purses, sow or otherwise, if they would save cotton and linen rags.

Prizes were offered by the American Company of Booksellers for those who might suggest the practical use of materials other than linen, cotton, or even woolen rags. But the trick was that actual paper had to be produced from the suggestions, not just theoretical ideas from idle pipe dreams.

From China now came rice paper. Or so it was called, probably from the use of rice straw from the end of the seasonal mud paddies. Anyhow, this pulp-straw made beautiful artificial flowers. Royalty bought and popularized them in England; and, although Woolworth, the famed ten cent store man, was not

then in business nor alive, mercnants of many sorts made money by selling the paper flowers for as much as seventy guineas the bouquet. Formosa, then controlled by China, seemed to have been the first source of this rice paper, so called, and from which early cigarettes (not then in use at all) were supposed to have been wrapped by similar paper imported from France in later years of the past century.

In nothern New York State (then a wilderness) the first paper mill along the Black River country, afterward famous for its pulp mills, advertised for rags from "Upper Canada," meaning, no doubt, the territory along the St. Lawrence, as this call went out just previous to the War of 1812, along about 1807. Poetry invariably accompanied such calls, as it was then believed that all women (especially the *ladies*) admired all forms of poetry. Even newspapers, of the time, accepted rags for subscriptions. Newsprint (hardly to be called that, at the time) was so scarce that papers were printing fewer and smaller editions, some of them on the reverse side of all sorts of printed matter. Three cents the pound was paid for good, clean rags. All waste paper was also saved, even old letters, envelopes, or whatever came from home and office sweepings.

Not only were rags in such demand, but even ships were offered cash for old sails, ropes, hemp of any sort. Ports of entry, like Boston and New York, were excellent markets for this sort of thing, as all ships were then sailing craft, just previous to Robert Fulton's invention of the steamboat in 1807.

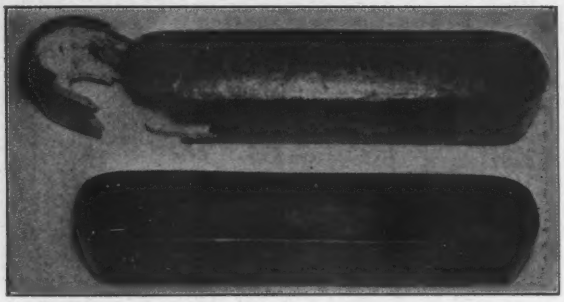
In Italy, on the Isle of Sicily, Chevalier Landolina had long claimed that the first pulp was from papyrus pith in Egypt, B. C. But this was never substantiated fully, although experiments proved that it might have been possible. Landolina died in 1810, after making several such experiments.

In that year, too, the United States started to im-

Korean and Japanese Paper and Papermaking Equipment

One of the cases in the Paper Museum devoted to the craft of making paper in Japan and Korea. Several moulds from these countries may be seen, as well as the cultivating and beating tools used in preparing the mitsuma, gampi, and mulberry fibres that are extensively used as papermaking material in the Orient. On the top shelf of the case are shown old colored papers from Korea, where the coloring of pulp in the vat was originated in the sixteenth century. Koreans were also the first to make envelopes. Ancient manuscript papers from Japan, made in the tenth and eleventh centuries, are also displayed in this case.

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)



(Courtesy, Dard Hunter Paper Museum, Mass. Inst. of Technology.)

Persian Paper Coffin

A falcon's coffin made in Persia at a remote period, perhaps more than 800 years ago. This coffin is interesting to present-day papermakers, as it is formed entirely of laminated sheets of paper, showing the early invention of fabricated paper board, such as manufactured today, and used for many utilitarian purposes. Paper Museum also possesses original documents, showing that ships, coaches, furniture, sedan-chairs, etc., were made of paper as early as the middle eighteenth century.

port vast quantities of rags from Europe. There appeared to be more rags over there, and the price was low. Burlap sacks were used in London for pulp. But straw paper continued in popularity in France and in Germany. Numerous machine inventions, about this time, gave great impetus to the paper industry. Not all of them were practical, of course, but the pulp business became even more important as trade demanded better and better paper, with improved methods of making pulp. Bertholet, in France, found another bleaching process. French manufacturers devoted more time to specialties, and each mill became more or less famous for its particular field.

To get at the vast resources in water power and in other means of low cost production, a mill was at last opened at Lackville, now Bedford, Nova Scotia. That is about eight miles from Halifax, on the Nine Mile River. Thomas Holland opened it, as he also owned a newspaper in Halifax. But it produced brown paper, hardly white enough for newsprint. Pulp was plentiful, right on the spot, if Holland had only known, at the time, that spruce logs could have been used for pulping. This was in 1816, when wood pulp was still a half century from its inauguration in America and in Canada.

Bleaching was called into question, at this period, because of ill effect some mills found with finished paper in England. Bibles, printed two years previously, fell apart, with crumbling paper. Yet, in the United States, a Philadelphia mill owner, Thomas Amies, made special paper for a printing of the Declaration of Independence in 1817, and it was very fine, made only of linen rag stock. Each ream weighed 140 pounds, and it cost $125, by the ream.

High glazing had come into gradual use in England. Also, hemp, silk, flax, and Russian linen were used for pulping in Britain to make very fine white paper. Some English newspapers were printed on so called rice paper, made from rice straw. In France, too, straw was used to make white paper. Even Denmark had some paper made from sea weed, said to be white and strong. Licorice wood, also, in France was used for pulp. It was mixed with hemp.

Rags, said the American printers and booksellers to Congress, had no value, except for paper. So they asked the lawmakers to retain the duty on imported books. All other items in their manufacture were produced here, they claimed, and even rags, to a great extent, were found in this country, but the balance, of course, had to come from abroad. France was a tremendous source of supply of rags, and had been for years.

At last, around the first quarter mark of the nineteenth century, a Polish, or Russian, mill found that heavy straw paper could be used for roofing. It was believed to be both fire and water proof. Sulphate of lime and gypsum were also being used in England to weight paper about 12%. Consumers complained about it.

Wrapping paper was made in England, too, from old rope and burlap bags. France was experimenting with pulp made from hemp Hop vines, also, were made into English wrapping paper. It was brown, like most all wrapping. Even moss also was so used. But the old fashioned hand mills in Japan continued to produce beautiful mulberry tree paper from pulp of that character. Veau vacine came from France, being excellent in colored paper at 80 to 100 francs the ream. Pine shavings were used for pulp in both bleached and unbleached brown wrapping paper in England. A mill in Hampshire turned it out. In Italy, too, poplar wood was used for pulp. Wrapping, printing, and even writing paper were so made at a mill in Turin. Sizing progress was made in France when wax was substituted for gelatine, as was rosin.

Many serious fires were occuring in both paper mills and warehouses in many parts of America. Rag warehouses appeared to be particularly susceptible to fire. About 1825 these losses were huge, and getting larger each year.

Alum and rosin, dissolved in soda, were found to be a good size if used with potato starch. French writing and printing papers were then so sized. Mills in Pennsylvania were experimenting with many straws and grasses. This paper came out yellow in color, but strong. Corn husks were again used, also. Beeswax and alum were now used in England to size and glaze paper. Massachusetts, in 1829, was using 1,700 tons of rag stock annually in its mills. Probably one of the first pulp dressers to appear came from Vermont, in 1830. Another Yankee invention, from Connecticut, was a piece of equipment to clean rags. Chlorine now came into greater use to clean rags, even though they were filthy. So undesirable material, of that sort, soon rose 300% in value in the United States.

Chiffonniers was the general name applied to rag collectors in Paris, where rags were, indeed, a big business. They frequently clashed with the Parisian police, as their street searching came into conflict with efforts of municipal sanitation, otherwise street cleaning, then very sketchy, yet too much for the chiffonniers.

Several other rag cleaning machines came into more or less general use in America. A number of inventors competed for pulp strainers. Cleaners of all sorts were especially numerous about 1830. Almost every patent, of the times, originated either in Massachusetts, Vermont, New York, or Pennsylvania. All these eager inventors aspired to the same purpose — cleaner rags.

Lime water was used in France to neutralize acid in lithographic paper. Knots and lumps still gave pulp makers lots of trouble, though many improvements had gradually been made to vats. But a Massachusetts inventor got up a new pulp of mixed sulphur and finely ground coal dust, with salt and lime, to make it inflammable for roofing and sheathing.

In an illuminating note of the PAPER TRADE JOURNAL July 15, 1875, three years after the inauguration of this paper, it was stated that hand made paper had almost ceased in French production in 1832.

Chlorine came under attack in England, as it was said that books printed on paper, bleached with chlorine, fell to pieces in just a few years. In Ireland, the national peat was used for pulping, but this was not of good quality. Rags now came from the West Indies in quantity. Haiti alone exported 31,192 pounds of rags in 1835. Importation of all rags into the United States by 1839 reached $588,318 in total value. A great part of this material went to Lee, Massachusetts, where one-fifth of all the paper made in the United States was produced in 1840.

West Indians, realizing the necessities of rags and

Rag Smuggling Was an Industry in France

In 1823 a Roll of Ancient Papyrus Was Found in the East Indies

of other pulping in the United States and in Europe, tried to induce American mills to import banana leaves. But the banana leaf pulping process, and bleaching, necessitated great losses, amounting to fully one-third of the product. Both Martinique and Cuba tried the banana experiment without success in pulping. Italy, Austria, and other parts of southern Europe, were contributing much of England's rag stock. But this was suitable only for printing paper. Cleaner, better rags were gathered in Britain itself for writing paper production.

Along in 1842 it was estimated that the United States required fully six million dollars' worth of rags annually to make pulp for its increasing number of mills. This covered about 175,000,000 pounds. But the value of rag importation had fallen off, year by year, until, in 1842, it represented only $468,230 in value. Perhaps this was partly due to the decrease in the value of the rags per pound, but the statistics fail to show it. In fact, by 1843, this figure was again sharply reduced to only $79,853. This was then due, principally, to a new import duty on rags, with greater enforcement of the act. But, by the next year, 1844, rags had advanced to $295,586 in value from abroad.

It was that year, too, that an unrecognized great event occurred in Germany. Keller took out his first wood grinding machine patents. Voelter obtained these valuable rights, as Keller was too poor to go on with the work. But the plan for wood pulping did not flourish at the time, nor for several years thereafter. It was, however, the signal for the coming of practical wood pulping, and it was the actual date of the establishment of vast newsprint and paper progress for the entire industry.

Rag importation bounced back to nearly its former figures in 1845. Value was then set at $421,080 They were worth about 4c the pound. By the following year, 1846, another remarkable jump occurred in rag imports. They amounted to 9,837,706 pounds, of which fully 8,002,865 pounds came over from Italy. And to give evidence of the use of these rags more prolifically and with greater efficiency in the United States, it was noted that only two hand paper mills remained in 1847, as the paper machine and vat and mill improvements had made the production of paper so much quicker, easier, larger.

Voelter, meantime, was making some progress with his (Keller) wood grinding pulper in Germany. He was making crude newsprint, and the mills in this country were watching the experiment very closely, but with a suspicious eye. While that was going on in the German States, the United States continued to largely increase its importation of rags. At the close of the Mexican War this country brought in 17,014,587 pounds, with 13,803,036 from the largest shipper, Italy. Rags brought, that year, $3.68 the hundred pounds.

Rags had assumed so much importance in Italy that Leghorn, the straw hat center, was exporting 30,000 pounds (with some paper) in 1848. About half went to England, the balance to this country. England was trying to make water proof paper about this time. Pulp was saturated with linseed oil, and was said to be impervious to water. Italy continued to send lots of rags and waste paper here, but the quantity dropped two million pounds the following year, and the price paid was around $2.51 the hundred pounds. France was then importing 1,620,000 pounds of rags. But Belgium, in its small mills, imported only 14½ tons, inclusive of other waste material.

France now started wood grinding for its pulp. This was in a mill at Souche, in 1849. Germany was using 1,180,000 hundredweight in rags by 1850. Ebart, in Germany, perfected his "stone" or roofing paper that year at a mill in Neustadt Elberwald. Algiers was trying to induce mills to make pulp out of the dwarf palm,

American Maguey Was Used for Pulp in 1829, Recalling Days of Early Indian Use of Mexican Plants for Pulping 1,000 Years Previously

at 18 cents the hundred pounds. Great Britain, in its perpetual struggle to keep abreast of the paper demand, was now importing 8,124 tons of rags annually. Even Egypt contributed a small quota, said to have been snitched from the ancient tombs of the mummies along the Nile.

Nineteen countries were now supplying the rag requirements of the United States. Total had jumped to 20,696,875 pounds. Price paid was averaging $3.61 the hundred. Italy and Austria continued to ship the largest quantity to us, now totaling 15,861,266 pounds. In the following year, 1851, this again increased to 26,094,701 pounds, worth $903,747, or about $3.46 the hundred. Italy again led off with 18,512,673 pounds.

Spartum (esparto) came into use in France in 1852, when Farina made a pulp from waterbroom, consuming stalks and roots. All the trade, as usual, was opposed to the new material, but it gradually obtained some popularity. Oddity of this "discovery" was, however, that the Romans had used it, hundreds of years previously.

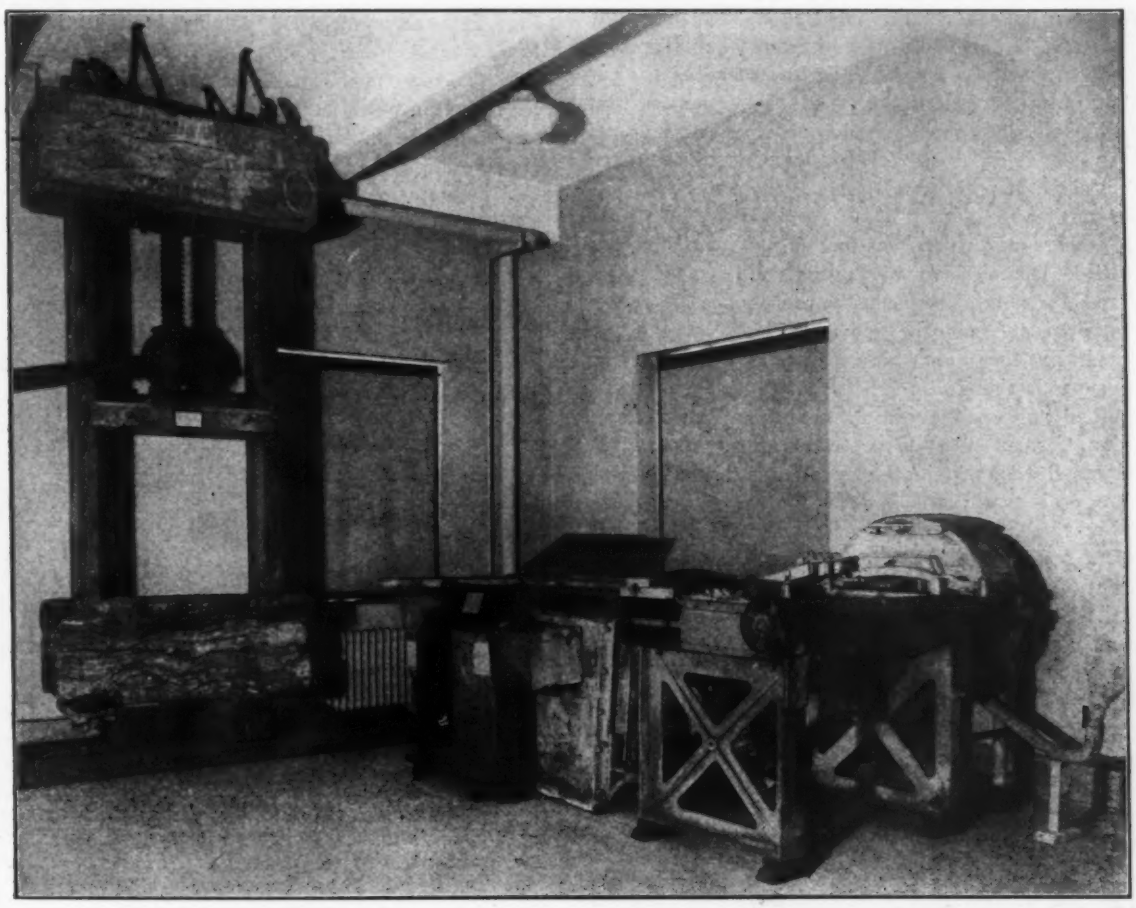
England was paying 26 shillings for first class rags in 1852. For poor quality the English mills paid only 7 shillings. England usually held on to all the rags it could get, but did export about 500 tons annually. In that year, however, 2,462 tons were delivered abroad. These were of British and Irish origin. And the United States, still beset with rag difficulty, obtained rags from 32 nations, covering 18,288,458 pounds in 1852. This material was brought for $3.46 the hundred, or a total of $626,729. Italy still sent over the largest lot, now reduced, though, to 12,220,570 pounds.

Coupier & Mellier, at Maidstone, England, succeeded in getting a pulp from wood, with soda or potash lye to dissolve the small fragments. This was probably one of the first attempts to make wood pulp with chemical solvents in the more modern manner. And this process had not reached the United States, in that year of 1852.

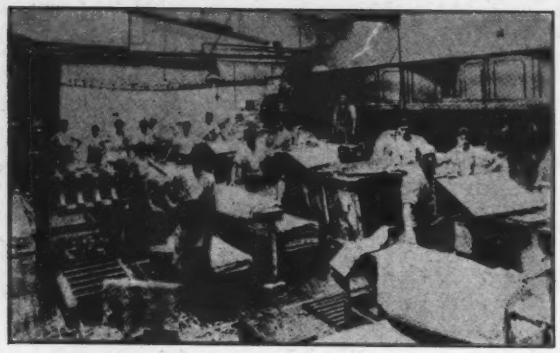
Franklin's source of paper supply, at the old 1713 mill along the Chester Creek, in Pennsylvania, was still making paper by the old fashioned hand pulping process, in contrast to the modernized methods of this

Hand Made Paper, Priceless Heirloom of the Ages

Complete equipment for the making of handmade paper, from about the year 1835. This apparatus was found in south England, and was brought to America especially for the Paper Museum. In time, this equipment will form a special exhibition in the museum, showing the entire interior of an old English or American paper mill. Finest drawing and water-color papers are still made with appliances of this same design.



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)



(Courtesy, Eynsford Paper Mills, Eynsford, Kent, England.)

A Modern English Hand Mill

Interior of a modern English handmade paper mill, showing various appliances

country and abroad. It only goes to show the difference in ideas, even as the modern wood pulping methods were coming to a head.

Again rags rose to an astounding figure in the following year of 1853. In that fiscal year the importation was 22,766,000 pounds, worth $982,837. And the price had advanced to $4.31 the hundred. Twenty-six countries contributed this amount, with Italy, of course, still shipping 14,171,292 pounds. England, too, was importing 9,332 tons of rags, as her pulping demands were enormous, likewise. Its paper business had increased 114% in twenty years. With Ireland included, the per capita consumption of paper was 5.40 pounds. But the United States made as much paper as England and France together, or over 270,000 tons annually. France used about 105,000 tons of rags; England, about 90,000 tons.

Southern white pine was first ground into shavings in 1853. This was done by Lavender & Lowe, of Baltimore, Maryland. They said the process cost 6¼ cents the pound, and could be sold for 12½ to 16 cents the pound. But they didn't have the proper equipment for a big production job.

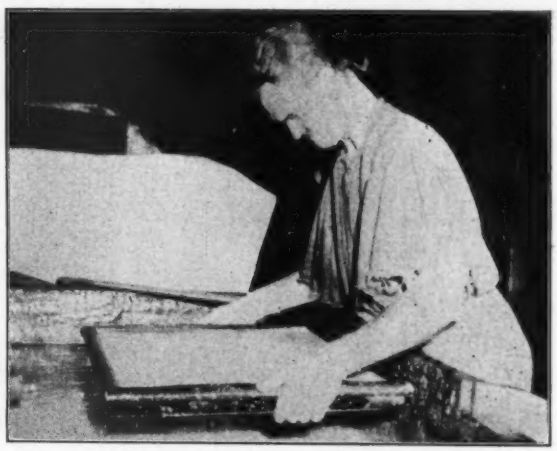
Wood pulping experiments continued in Germany, and a German obtained protection for a new wood pulper. But, in Britain, the use of rags continued on a larger scale than ever. By 1854, the use of rags there had reached 201,000,000 pounds a year. This had registered a gain of fully 50% in twenty years. France too, used 235,200,000 pounds of rags annually. While, in the United States, rags had jumped to 405,000,000 pounds, showing the great production of pulp for the ever astonishing increase in paper demanded by all forms of American business. Per capita use of paper, therefore, was 10.80 pounds in this country, and only 4.55 pounds for France and Britain, combined.

Dutch paper makers were complaining, now, about the export of rags. There was no duty on rag export in Holland, while most other neighboring States had protected their rag business with tariffs. Asbestos was again used in making pulp in England. It was supposed to be fireproof. Straw paper was also coming into use for newsprint. In Philadelphia the Public Ledger used it. It cost 9c the pound. It was made by Mellier French process, but was proven unsuited for American newspapers.

Rags were now worth 4 cents the pound. Manufactured paper averaged 10 cents the pound. Demand still exceeded the visible supply in the United States. Italy and Germany were still supplying the bulk of rag exports. Both Britain and the United States competed in their purchase on world markets. England was paying 32 to 34 shillings the hundredweight for the best stock, ten shillings for the poorest. Tuscany rags were were in demand by both England and America, and the quantity available was not over 10,000 to 12,000 tons annually. With the increasingly higher prices paid in England, a great share of this export was now sent there.

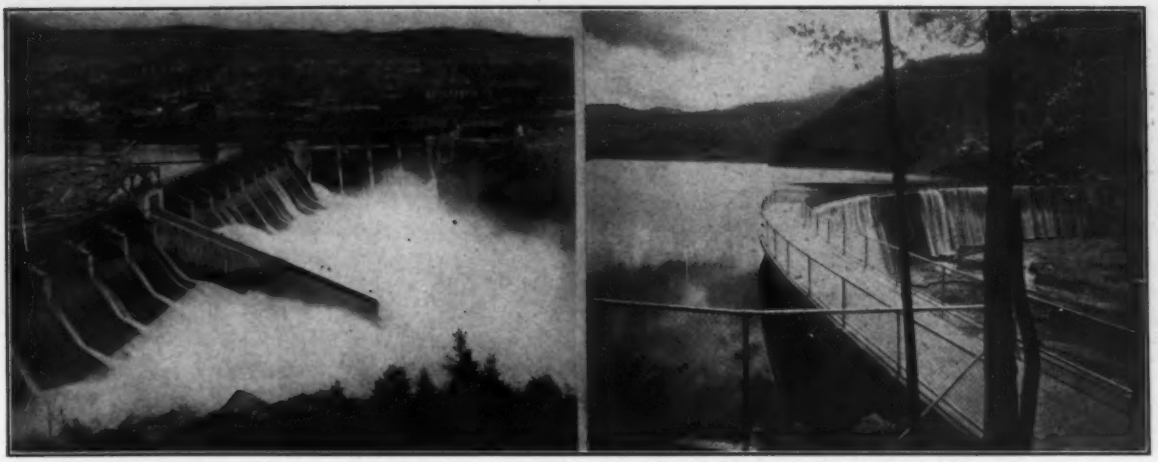
Paper advanced here 2½ cents the pound for newsprint. This made the newspapers reduce sizes, even cease publication, in some instances. Reciprocity on rags in 1854 resulted in free entry, in both the United States and Britain. Rags now increased, again to 32,615,753 pounds annually for the United States. Value of this total was $1,010,443 at $3.09 the hundred. And Italy, as usual, contributed the most ,24,240,999 pounds that year.

In England, the following year, 1855, the Watt & Burgess process of wood pulping brought the cost down to £24 the ton, while rags cost £40 the ton, in pulp. To meet tariff conditions abroad, England, that year, abolished the duty on rags altogether. Demand was still increasing for paper to such an extent that Britain could not find sufficient rags. America was



Making American Hand Made Paper

Robert Robertson, handmade papermaker, as he appeared in the historical section of the colored moving picture made by Springer Pictures, Inc., for the Kenwood Felt Company. Mr. Robertson came to America from Kent, England, in 1929, and was chief vatman for Dard Hunter Associates. Photograph was made in the vat-house of the Lime Rock, Connecticut, mill where handmade paper was made for a few years. This is now the only equipped handmade paper mill in America.



Contrasts in Paper Mill Water Power

forced to go to Egypt for its stock, for the first time. In this year, 1,215 bales of Egyptian rags arrived here. They were sold for about 4 cents the pound.

In that year, too, the increase in rag import was so large that the total represented 40,013,516 pounds. Value was set at $1,235,151, or $3.06 the hundred. More than 200,000 tons of manufactured paper was now being turned out in this country each year. It was again surprising that this total should be so much greater than the combined English-French output of 136,000 tons. All sorts of material—even leather remnants, ferns, sugar cane, cotton stalks, and so on—were being tried out for pulp, both here and abroad, but with doubtful results.

Bleaching now also engaged the attention of many practical paper makers and chemists in France, England, and the United States. Strange compounds of chemicals appeared under the guise of effective and inexpensive bleaches for pulp, in which chloride of lime now came out. Carbonic acid gas was also used. Processing, in fact, was almost as numerous (and secret) as the making of gold from base metals. Sulphuric acid was another of the suggestions for wood fibre pulp.

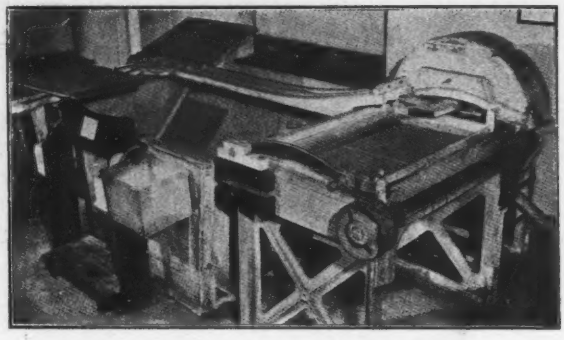
By 1857, the import of rags into this country had again risen to 44,582,080 pounds. Value was set at $1,448,125. Italy was sending over linen rags to the extent of 12,000 bales annually. Cotton and linen were mixed in the remaining 23,591 bales. Hamburg and Bremen sent us 2,000 bales of rags. New York and Boston continued to receive the largest shipments. Boston receipts usually went on by rail to Lee, Masschusetts, where more than a million pounds annually were used for writing paper there.

So many pulp and machine patents were now being issued, in both this country and abroad, that the paper industry had much difficulty in keeping pace with the program. Many of them, naturally, were of no use whatsoever. But of the comparatively few that succeeded in gaining attention and use, at least some of them lived on and on to be useful equipment for the growing paper industry. Based on the first element of the trade, pulp, this equipment was varied and interesting, according to just who was responsible for it. Many practical paper makers suggested improvements. These were made, not only in machines, but in processing methods.

In the perpetual struggle to find substitutes for rags, so many elements of more or less worthless material were proposed that the trade was, indeed, bewildered. Communication of the period, not being as rapid as today's, resulted in all sorts of rumors as to the worth or character of this or that patent or betterment. Yankee ingenuity, as usual, seemed to be in the lead with modernized ideas. Yet many practical suggestions came from abroad, especially from England and from Germany. Wood pulping, far from being the success at first believed possible by its originators, had laid dormant for years, with only minor use of its ultimate possibilities.

With the gradual approach of the American Civil War, conditions in this country were doubtful in 1860. Mills had been erected in many comparatively new sections of the country. Much of this apparent progress had been brought about by the protective tariff, now 24%. Imported stock (rags and waste paper) was great in total, but the import of completed paper was small. About all that appeared to be in demand here from abroad was a line of French specialties not made in this country, or, in the case of some fancy grades of writing paper, not so plentiful here, at that time. Yet the pre-war difficulties were numerous. Mills were closing, again, for lack of business. Prices were too low, profits apparently barely existent. Sixty-five per cent of all rag pulp stock originated here. This was largely of southern cotton fabric. And 12% was from cotton waste, rope and bagging. Balance was imported.

Cigarettes were coming into larger use abroad, but not in this country until 1863, when, even then, the manufacture was small, indeed, amounting to only a few hundred thousand in the fiscal year 1863, when the first American revenue tax was collected as a war



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

English Hand Made Paper Mill

Complete equipment of an English handmade paper mill with appliances consisting of the lifting box, knotter, agitator, bridge, and vat. A mould, with its deckle in place, is shown on the "stay," while a mould, in front of the vat, and the coucher takes his place at the far end, near the "asp." Finest papers, like the finest weaving, are still made by hand. Handmade papers are used for architectural and engineering drawings, water color painting, and for the printing of engravings, wood-blocks, etchings, photogravures, as well as for the making of de luxe books. Aside from any aesthetic features, the technical advantages of handmade papers, over those made on a machine, are the crossed fibers and the natural shrinkage.

measure. Both this foreign demand had created a new business abroad in cigarette paper. It had to be very thin, and practically non-existent in ash content. So French manufacturers evolved a so-called "rice" paper. Rags, indeed, made the first cigarette paper, even as flax is used today. But Algeria suggested that hibiscus esculentus, resembling flax, be used. It made a coarse linen stock, stronger than cotton. And the new cigarette paper pulp was made from discarded leaves and stalks, hitherto thrown away.

Rags, in England, still scarce, cost three pence the pound in 1860. In France, they cost only half that, one and one-half pence. Holland, Belgium, France, Spain, Portugal had long forbidden the export of rags. Prices were going lower, just as our own war broke out, making an almost instantaneous increase in all prices, inclusive, of course, of even rags. This was a radical change, in 1861-2, from the previously depressed state of the paper industry, and, in fact, all business in the country, at the time. There were only fifteen paper mills in all the seceding south, as the war started, so southern newsprint and all other paper immediately became exceedingly scarce. Paper in New York, too, jumped from 9 cents the pound to 22 cents. Pulp was again spelled with a capital "P."

Writing paper was increased from 13 to 14 cents the pound to 17 for flat cap, and from 15 to 25 cents for fine letter and note paper. This was in 1862, after the war had been going just about a year.

In France, much progress had been made with colored paper. Pulp was treated in the vat until 229 specimens of colored paper had been made, even thirty years previously. In this country more attention had been paid to making stronger, white stock. Colored papers came into demand, but white was still the predominant stock, especially for business.

In this year of 1862, too, Congress removed the duty from all imported rags, as a war measure. Paper was wanted in ever increasing quantities, and all sources of pulp stock were searched for material. Newsprint reached 17 cents the pound, from a pre-war low of 8 cents. Printing paper was billed at an average of 30 cents; writing paper at 40 cents the pound. Cotton was unobtainable, as it all came from the southern States, now in secession, in active war with the north. So even twine was now made of paper.

Scottish paper makers were using 964 tons of chloride of lime in bleaching at their mills in North Esk in 1863. England was using quite a bit of the now more popular esparto grass, also known as alfa fibre, running to 18,000 tons that year. So it required an increasingly large use of soda ash and bleaching powders, to the extent of 4,000 tons. Newsprint was mostly made of it, and cheap grades of newsprint now used but one-fourth in rags, where, years previously, the rag content had been almost total. Result: newspapers did not last so long.

In Boston, the Journal came out on the then new basswood paper, also technically named Tilia Americana. Newsprint was now selling at the war price of 32 cents the pound, entirely controlled by supply and demand. Search for rags went on endlessly. Even Madras was appealed to, and dealers there gathered 2,022 hundred weight, shipped abroad. Italy now doubled its rag export duty. Both France and Belgium set £5 the ton on export rags. Holland charged £4 the ton duty. German States put £9 tax the ton on waste and rags, but England, meanwhile, still exported rags free of duty. So English mills objected to this, and asked Parliament to do what it could to get the other nations to renounce rag and waste duties.

In 1864, book paper was 45 cents the pound. Waste paper paid collectors 8 cents the pound. Whole families engaged in the search for waste in American towns and cities, even in the country. Thousands of tons of this material were recovered and sold to the mills, anxiously awaiting its arrival. Russia, willing to sell rags and waste at the top prices now paid abroad, reduced the western duty one-half, to 7⅓ francs from 14⅔ francs a kilometer. France was still charging 12% on rag export. British mills again objected to this. Britain had taken 4,215,630 kilograms of rags in 1863 from France for the mills.

Indications of the forced arrival of wood pulping occured in 1865, just after the close of the war, at Manayunk, Pennsylvania. For the Wood Pulp Works Company was organized, with a capacity of 300 hundredweight of wood pulp daily, using the process of Watt & Burgess. From 18 cents to 60 cents the pound was paid now for paper by grades, from Manila wrapping to first class note paper. Newsprint decreased,

(From Papermaking in Southern Siam, by Dard Hunter, 1936.)

Making Paper at the Bangsoom Mill

This is from the Tym Niltonkum paper mill in Bangstroom, Siam. Mould is floated on the stream, and the paper stock poured upon it. This is the technique of Tibet, Burma, Nepal, and Siam, and is probably the oldest method of making paper, dating back from the second century.

however, 8 cents the pound on advance information that Congress would remove the duty on paper, so the current quotations averaged about 18 cents. But a drouth stopped the water mills, and paper again advanced. Massachusetts mills were then using 34,165 tons of raw material a year. Some Connecticut mills continued the use of Egyptian mummy rags and other near-east waste to make paper. At Lee, Massachusetts, a girl, sorting rags, found four $100 bills in the Columbia Mill in 1866.

France had to import rags in 1867. This business ran to 5,136,569 kilograms that year. But, on the other hand, 1,429,055 kilos were exported. Kilos are 1/24th of an ounce. Now that peace had come to the United States again, newspaper (and other paper) decreased in price, newsprint going to 16 cents the pound. It promised to go much lower. But Russian rags, the following year, advanced 100%. Greece, then without any paper mills at all, collected 12,000 tons of rags, exported to both France and England.

In 1868, too, the famous writing paper mills at Lee, Massachusetts, used 14 million pounds of rags, but the total for Berkshire County, that State, was 28 millions inclusive of Lee. Straw, long a substantial portion of newsprint and wrapping paper, now advanced to $20 the ton. Mills using straw had sprung up all over Pennsylvania and New York States. East Indian and Malayan vegetation was now also used, in part, for pulping. But it was hardly the success anticipated.

Rags continued to flow heavily into the port of New York, By 1869 there were 104,661 bales, worth $2,149,202, coming in. And the domestic collection of rags continued apace. Even in England the price of rags forced paper mills to advance prices 10% in 1870. Esparto grass came into England, now, at the rate of 100.000 tons annually. Esparto, too, advanced from £4 to £10 the ton. In this year, though, American paper prices decreased. Superfine book paper sold for 20 to 24 cents the pound, fine book at 16 to 17 cents; newsprint at 12 to 12½ cents, practically all of straw paper, as sufficent new wood pulping had not yet come to market.

A year later, in 1871, straw had advanced, again, to $25 the ton. But this was only in the east, where straw was comparatively scarce. In the west, where it thrived, and there were few, if any, straw mills, the price received was only $4, to even as low as $1 the ton. Straw newsprint was bringing 12 cents the pound in New York. Wrapping straw, that famous heavy brown "butcher's paper" was sold for 4½ to 5 cents the pound. England was still going on esparto grass, especially that from Algiers. Lloyds of London brought this over in their own ships. It came right to the mill door at Medway, via water route, all the way.

Rice straw paper came to Washington from Japan as samples for the patent office. It was hand made, as Japs had recently been in this country, saying they intended to take paper making machinery back to Japan with them, and that it would be an innovation there in the land of the Mikado, recently opened to world traffic by the action of Commodore Perry. Two hundred and sixty-three different kinds of hand made paper were then made in Yeddo, Japan. These specimens included everything from tissue, for lanterns and handkerchiefs, to heavy paper for overcoats, and even for pans on the fire. Yet Japan was buying some paper made in Germany, too.

To give responsible evidence of the increasingly large paper industry in this country in 1872, the year this PAPER TRADE JOURNAL was inaugurated, the JOURNAL reported that rags, free of duty, were now arriving at the rate of 128,280,225 pounds. They were currently

(Courtesy, Dard Hunter)

Ageless, Yet Modern, Siamese Paper-Making

After the mould is filled with stock it is agitated while floating on the surface of the stream. Paper is allowed to dry upon the mould, so many moulds are required. This sheet of paper measures about 16 by 60 inches. Paper is stained black, and is used by Buddhist priests in temples of Siam.

valued at $4,890,045, with about 50% from British ports, now once more freely exporting to the United States, after the prolonged friction of our civil war.

Again England imported a larger lot of esparto from the Mediterranean countries. Some 130,000 tons came over in 1872. Even the famous "Thunderer," the London Times, was printed on this sort of newsprint. To show the shift of the times, rags, which had formerly come so largely from Italy to the United States, now came from Britain. In that year, 45,750 bales came over from England, while Italy sent only 23,134 bales, and the near-east 11,149 bales. Turkey was sending lots of rags abroad, their total in 1873 had reached 7,507,-967 pounds in that fiscal year. But, by 1875, the paper industry was very much depressed, following the money panic in the United States. It was estimated that, actually, 200 million pounds of rags were being used throughout the world in wool, or cotton, while linen rags, straw, wood, and many other materials were also used for pulp.

Rags were the standard, however for old established rag experts reported that rags, in paper, have stood the test for a thousand years, and more, as rag paper is almost impervious to sun and air, while wood pulp, of course, becomes brittle, and the paper soon dissolves, practically. When wood pulping came into more pronounced use, after 1870, some paper mills insisted on continuing with rag content, wherever possible. Sulphite process paper has been made to resemble rag paper. In many cases, in fact, modern paper is composed of part rag, part sulphite content.

Sulphite is used for business in letterheads and in paper other than record paper, wanted for permanence. Rag paper costs more money, naturally. It is freely claimed that rag paper may be folded with the grain of the paper over 1,200 times without breaking, and over 1,000 times across the sheet. While sulphite paper breaks in about 100 folds, either way across.

Rag pulp and sulphite pulp may be mixed as desired. This was indicated by a surge of processing and patents that suddenly engulfed the patent office at Washingtgon, in the years immediately following the civil war. Ground wood processing came forth almost overnight as the patents on this formula became practical in Germany, and, later, in the United States. Albrecht Pagenstecher made commercial wood pulp at Curtisville, now Interlaken, Massachusetts. Keller-Voelter patents were used in two wood grinding machines brought over from Germany in 1866. Germany was far ahead of this country in the processing, as the original patents had been taken out there, and the crude machines built and put into practice.

Only half a ton of this wood pulp was made daily at the Curtisville mill. It sold for 8 cents the pound to the famous Smith Paper Company, at Lee, Massachusetts. And the Smith mill converted it immediately into paper. Another Pagenstecher mill was started at Luzerne, New York. Grinding machinery for that mill was made in this country, and Warner Miller had an interest in it. Afterward, this became the mill of the Hudson River Pulp & Paper Company. Pulp was block pressed, and sold that way to the processing mills. Finally, Miller advocated a sheet mill for the pulp, and a cylinder machine was so made.

There followed a wood grinder made by Benjamin F. Barker. Mr. Barker operated a mill near Curtisville. Supplies of wood pulp paper were sold to newspapers in New York, as the price was much less than the formerly used straw pulp. Both the Staats-Zeitung and the World used the new wood pulp paper.

But sulphite had the attention of mills and chemists in a half dozen lands. Following the abandoned Benjamin Tilghman lead, processors evolved the 1882 Wheelwright production of sulphite at Providence, Rhode Island. It was 1887, however, before commercial sulphite appeared in quantity. Sulphite and soda pulp were imported, though, into this country from Europe, between the time of the early sulphite waste mills in Michigan and in Pennsylvania really got into production. This was along in the 1890's, when business conditions were none too good across the country, in paper as in everything else. Business, prices were declining. Mills were shutting up. Bleached and unbleached pulps came over from Europe at the then prevailing low tariff rates, hiked by M'Kinley when he became President in 1896.

Sulphate pulp became available in 1884, when Carl Dahl processed the first of it at Danzig, Germany. Kraft, too, came along as a product of Sweden. A modification of the original caustic soda processing became the sulphate method of kraft, using sodium sulphate salt, in place of the previous soda, or caustic, ash. All this resulted in lower cost pulp, using refuse ma-

(Courtesy, The Byron Weston Company)

Sheets Drying in Looped Folds

(Courtesy, The Byron Weston Company)

Counting Every Single Sheet

terial found outside the saw mills, wood working plants, where sawdust was so plentiful. That is exactly where the northern countries of Finland, Norway and Sweden came in the picture. For it was twenty-seven years later before the first successfull sulphate mill was actually operating in this country.

Chemical wood pulp came here in quantity in the early days of this century. English china clay also came in. Coated papers required this material, and American importers were not slow to recognize its pulping advantage. Cornwall, England, was the original source of this coating filler. Sulphite pulp was being made in quantity at the Canadian mills of the St. Lawrence Paper Company, of Chandler, Quebec. This was brought here to New York, and made into American newpsprint, right in the heart of the newspaper business field.

First world war created the usual war shortage in paper and in pulp, too. Groundwood pulp hit $20 a ton in 1917. Before the war ended it was $145 a ton, with newsprint at $360 the ton. In 1893, the price had been $56 the ton. And it went down to $35 in 1899, before the climb of eventual "full dinner pail" prosperity increased the prices of paper of all grades and types.

To indicate how the industry grew, in 1927 the output of wood pulp for this country rose to three million tons. Yet more than one-half of this raw material came from abroad. Sulphite mills were opening up in the west, on the coast, and the south also showed evidence of producing pine wood pulp. Spruce was then becoming scarce in the northern States. Scandinavian mills were making lots of pulp, and so were the Canadian mills. Sulphate production induced stronger paper, and the middle western mills, then new, began to be a factor. Kraft paper gave a great impulse to the paper industry when the first mill was established here in 1909. As barrels and boxes of wood went out, kraft containers came in, and another American industry was thus created.

Modern wrapping and packaging had also helped the paper industry. Designs were created that made trade marks enduring on shipments with containers. Sulphate pulp, from the southern pine forests, enabled the container industry to become just that. Charles H. Herty was responsible for that.

Second world war was the signal for another spurt in production. More and more articles had to made and packaged in paper. Pulp had to be obtained for this vast supply. And the story of pulp would be far from complete without recognition of its original source—rags. All other processing and technical improvement starts where rags came into the paper picture.

CHAPTER XIII

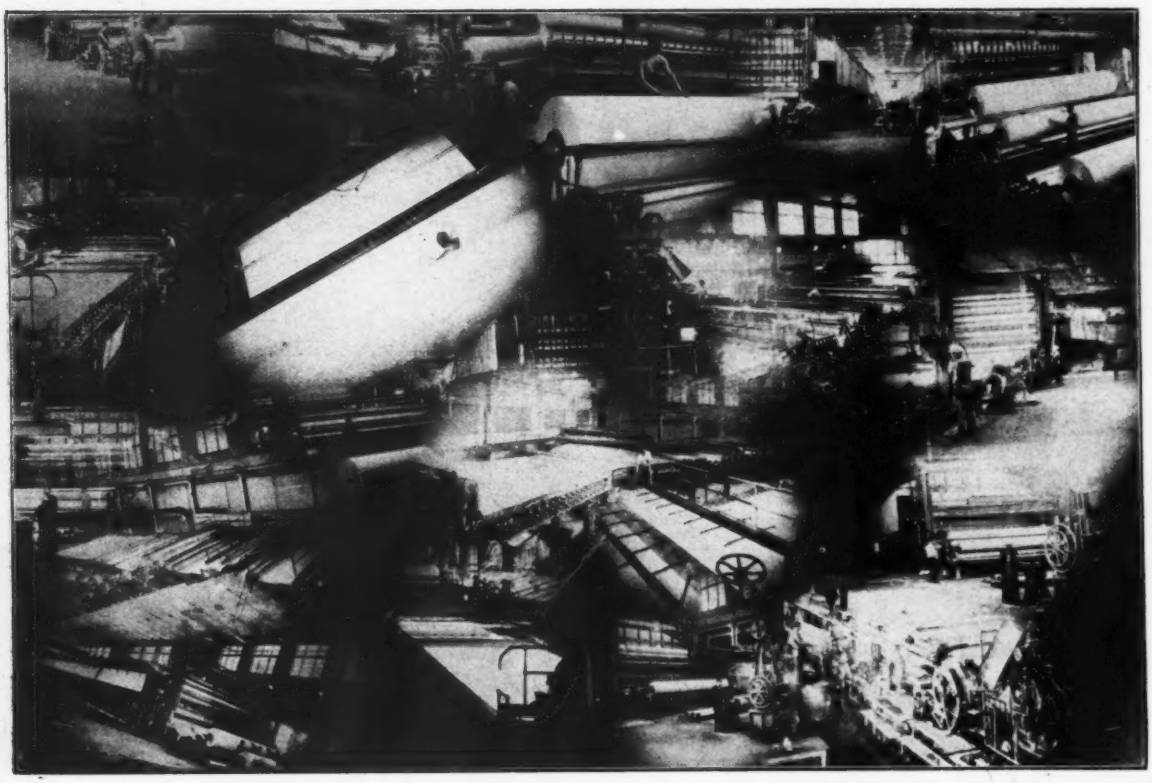
Some Figures on Pulp And the Paper Thereof

JUST before the past world war, waste paper sold at the very low price of $10 the ton, and under. Now, for the past few months, the price of waste is double that, or $20 the ton, and more. Junk newspapers bring $30 the ton. White papeterie cuttings bring $125 the ton. And some of these dealers—and the mills—have paid upward of $200 the ton for choice stock. All this is included in the story—rather the scramble—of waste for pulp. As this 75th Anniversary Edition of the PAPER TRADE JOURNAL goes to press, the outlook is for high, and higher, prices for waste for the entire 1947 year, and quite likely, into 1948.

In the old times, Scandinavian shipments invariably started a decline in pulp prices in the Spring of each season. This was due to the opening of the frozen north, and the boats coming through, direct to the Hudson River port of Albany, for example, with something like 134 ships, as occurred just previous to the war in one single season, for the Hudson freezes over solidly, too, in the Winter, as the salt tide ends around Poughkeepsie, half way up the river.

To give some idea of the importance of waste in pulp, we may observe that the National Association of Waste Material Dealers embraces five subsidiary groups. A great part of these secondary associations is in metal procurement. But the Waste Paper Institute, alone, is accountable for $175,000,000 in annual supplies. Roughly, the Cotton Rag Council acquires $38,000,000 in total annual procurement of rags and other paper stock. This is divided into $22,000,000 for cotton rags, $16,000,000 in other waste material. Wool Stock Institute covers $70,000,000 in woolen rags and in other waste. Then there is another $50,000,000 in burlap and textile waste. So we may see that the total waste market is, indeed, a $333,000,000

Song of the Mill—Paper, Paper, Paper—from the Massed Batteries of Singing Fourdrinier Paper Machines



(Courtesy, International Paper Company)

field for the pulp people, right here in the United States.

But waste and pulp dealers always have their individual and group difficulties. At the 1947 Spring meeting in Chicago it was freely asserted that waste dealers strenuously object to charitable organizations gathering waste, selling it directly to the mills. This, they feel, is a violation of so-called trade ethics. It is amazing, forsooth, that the Boy Scouts, for instance, collect, in some cities, as much as $1,000 annually in scrap, largely in waste paper. Salvation Army is another source of tremendous scrap volume. Gathered in very small quantities, from door to door, it is, sometimes, astonishing just what the total amounts to daily and weekly, to say nothing of the annual take in this way.

Office building collection of waste, however, is what really counts. Some big city buildings contribute as much as a ton of waste daily. One department store assembles some 2,638 tons annually, or approximately 220 tons monthly. In 1946, the paper mills of this country used 7,340,000 bales (of one ton each) of waste paper for pulp. From this, as a base, 19 million tons of paper was produced. In 1940, just previous to the war, only 4½ millions tons of waste paper were collected.

With the demand for paper and pulp what it is, intensive search and "research" has developed an 18% increase in waste paper collections over 1946, so far this year. It is expected that the total take in 1947 shall be fully 7½ million tons. With this as a basic pulp, it is anticipated that paper production shall be actually more than 20 million tons.

Fine paper mills have also been beset with all sorts of troubles. Cotton is no longer king. High rag pulp content requires the rags, to say the least. Synthetic "weights" for cotton, such as resins, have reduced the possible take in cotton waste in the textile industry. Shirts and clothing, generally, because of competitive pricing, have been made of so many other things than cotton that the paper mills have been at their wits ends to obtain rags. All these synthetics have to be sorted out in the rag picking game, and the result is that rag prices have advanced sixty to eighty per cent in less than a year.

Raw cotton, therefore, is being used for pulp in increasing quantities. If the cotton price should eventually come down to just where the paper mills could use more of this raw stock from the south, the whole picture of pulping (and of rags and waste) may change, almost overnight. Just to give an idea what must be abstracted from waste from textile mills, we have threads of nylon, rubber, asbestos, glass, and other objectionable fibres that must be eliminated. Rollers are ruined by these synthetic globules. Paper is torn as it leaves the Fourdriniers. Acids fail to dissolve these synthetics. Dyes, too, are sometimes pulp-proof. Especially is this true of Army-Navy fungus resistant material, now on the market in quantity.

(Courtesy, The Byron Weston Company)

Inspection, Sheet-by-Sheet

Among the largest competitors of the pulp mills for rags are the roofing and other such industries, which require 240 million pounds annually for all sorts of what the mills call "ulterior" purposes. But 21c the pound for rags is still 25% over pre-war prices, and the pulpers and the "wipers" are battling for what's in the market, no matter what the price may be. But the roofers, using inferior stock, of course, pay only 2c the pound for rags. Foreign rags, practically eliminated by the war, are slowly coming back again. American rags, especially of wool, often sell abroad at higher prices to shoddy workers in European clothing. High ocean freight rates have taken their toll of the rag business coming in from abroad. Then, too, Europeans haven't been casting off even ragged garments for the past few years.

Last year, 1946, our Department of Commerce reports that domestic receipts of pulpwood amounted to 18,938,000 cords. Use was 17,803,000 cords. Imports were 1,728,000 cords. Wood pulp production here was 10,604,000 tons, use 12,094,000 tons, with imports set at 1,795,000 tons. Waste paper receipts were set at 7,487,000 tons, use at 7,296,000 tons, inventories (January 1, 1947) at a nominal 504,000 tons.

Paper and fibreboard production was announced in 1946 at 19,179,000 tons, divided into 9,747,000 tons for paper, 9,432,000 tons for fibreboard. Imports (of all) were 3,622,000 tons, exports 305,000 tons. Distribution, according to the 1940 average of 100, was heavy at year-end, with the arbitrary figure set at 206.0 in December, 1946, for wholesalers.

So, from the apparent figures, it is seen that 1946 was a remarkable year. In eight years the produc-

(Courtesy, Great Northern Paper Company)

Dumping Car of Pulpwood

Close-up end view of the car, showing holding-down clamps and cylinders, It will be noted that the load discharges before the full maximum angle is reached.

tion schedules had risen 40%. More that two million more cords of pulpwood was required for the trade. Wood pulp rose 700,000 tons more than the pre-war 1941. Waste paper, at 7,300,000 tons, was 67% over 1939. But wood pulp production fell off, as it was 180,000 tons below the top of 1942. Yet it topped 1939 by more than 50%.

It was a bad year for the industrialization of the mills. Machinery was worn out, and some had to be rebuilt. Some new machines were installed, but had to await parts for practical perfection. Labor was scarce. Even in the logging camps the problem of replacement of war prisoners with new civilian labor was a top headache. Pulp was obtained, in part, from Sweden. O.P.A. controls were removed from the industry. Book and groundwood printing paper, wrapping and bag paper, and folding boxboard were sharply increased, notwithstanding the many intricate problems involved.

Canada and Newfoundland contributed more than their share of increased newsprint, so much in demand, and so scarce that many newspapers were forced to condense their issues. More than a million tons of larger imports of this necessity were brought into this country from our northern neighbors, over the figure for 1944. Paper wholesalers reported a 1946 dollar sales gain of 125% over 1939. But consumers still demanded more and more paper, and of almost every classification.

Canada and Sweden are still contributing the bulk of our imports. In January, 1947, the total of wood pulp, for example, was 105,407 short tons from Canada, 57,884 from Sweden, with Finland sending over only 4,385 short tons, Norway but 276. This was a total of 167,952 short tons, with the bulk, as usual, in sulphite, unbleached, at 52,352 short tons.

Canada, contributing 10% of all the pulpwood we use, increased its shipments in 1946 by 17%. In the Pacific northwest it is apparent that the needs of pulpwood are increasing at such a rate that it is outdistancing the balance of the country. But the Lake States are hardly holding their own in the total picture. With some 3,800,000 cords on hand for the January, 1947, inventories, the country was assured of its Winter pulp production, at least. Northeastern operations were also good, but the south fell off in pulpwood production. Yet the south is using fully 40% of the entire nation's pulpwood, as it did in 1946.

Cutting of pulpwood was seriously handicapped by many outside occurrences, such as the labor troubles in Canada and in the Pacific northwest. Railroad freight car shortages also contributed to the mixed situation. Trucks, tractors, and all forest and mill equipment was in short supply, and in bad shape, as a rule. Also, competitive conditions with other industries, in obtaining wood, were notable. In the struggle to get pulpwood out, many a fierce inter-industrial battle was fought on the basis of labor supply and of compensation.

Pulp, paper and paper products were never in such tremendous demand. Not only was this country crying for more and more paper, but consumers abroad were likewise ordering more. Mechanization of the industry, from woodpulp operation to the mill, and, also, to distribution, in all its forms, is the only solution of the many diversified production and sales problems of the industry.

With the 1946 consumption of pulp set at 12,100,000 tons, the very largest in the long record of the paper industry, the figure exceeded 1945 by 12%, and also exceeded 1939 by 40% as previously mentioned. In charts picturizing the gains of the woodpulp industry, the overall sketch resembles the towering edifices of metropolitan New York. It is a new ski-line in paper.

Some 75% of all woodpulp used in this country is originated by the mills using it. Uncertainty of supply of the remaining 25%, however, is just what bothers the other mills. Market pulp is integrated with international circumstances, still upset by inconclusive peace and economic conditions. Half of this market supply, imported, is now compared with the pre-war picture, when our mills required one-fourth of all woodpulp from abroad. That was 70% of their total necessities. So the mills were at the mercy of rapidly changing conditions, from year to year, even month to month.

With 10,604,000 short tons of woodpulp produced in this country in 1946, the use of sulphite was 2,477,000 tons (bleached paper grades, inclusive of other bleaching, 785,000 tons). Sulphate ran to 4,590,000 tons (bleached, 751,000 tons; semi-bleached, 152,000 tons; unbleached, 3,687,000 tons). Soda was 474,000 tons. Groundwood, 1,809,000 tons. Defibrated, exploded, etc., 760,000 tons; screenings, damaged, semi-chemical, 494,000 tons.

This brought the consumption total to 12,094,000 short tons, of which sulphite was 3,151,000 tons (bleached, 1,674,000 tons; unbleached, 1,477,000

tons). Sulphate was 5,145,000 tons (bleached, 839,000 tons; semi-bleached, 185,000 tons; unbleached, 4,122,000 tons). Soda used was 491,000 tons. Groundwood used was 2,039,000 tons. Defibrated, exploded, etc., used 756,000 tons. Semi-chemical (screenings, damaged), 512,000 tons.

Sweden shipped us more than 60% of our pulp, previous to the war. But lack of coal last year, plus disparity of prices on world markets, reduced the shipping. Little Finland, struggling to regain its once proud world pulp position, also failed to meet its commitments, through no fault of its own. Norway was entirely off the market in 1946. Sweden had long been famous for its favorable trade with the United States, just before the war. It shipped fully 40% of all its pulp over here. Then, with other consuming nations in no economic position to buy pulp of Sweden, it was hoped that 50% of the pulp might be delivered here. But the price angle is still a subject of discussion with Swedish-American factors.

If Sweden had been able, in 1946, to ship all the pulp indicated earlier in the year, the production of American mills would have been enhanced by about 50%, or from 150,000 to 450,000 tons of American paper and paperboard from 100,000 to 300,000 tons of Swedish pulp. This would have almost automatically relieved the pressure on American mills for desired finished paper and paper products.

When a military commander sits down to draw up a "strategic" plan for encircling his enemy, he considers every element of chance and of fortune —also of disaster. And all trade elements admit that pulp was—and is—the strategic element of the day and date. In 1946, it was reported that 20 to 60% of many types of total American production of paper and of paperboard absolutely depended on the pulp situation, as the market operates on it. If it hadn't been for Canada and Newfoundland this country would have been in a bad situation, indeed. Sweden simply was in a most unfavorable position, to say the least.

All inventories January 1, 1947, were minus. From 23.8% to 60.0% they were all less than the previous pre-war recapitulation. For example, woodpulp was 490,000 short tons in stock when the year started. Of this, sulphite represented 232,000 tons; (bleached, 107,000 tons; unbleached, 125,000 tons). And sulphate was 176,000 tons (bleached, 36,000 tons; semi-bleached, 4,000 tons; unbleached, 136,000 tons). In soda there were 16,000 tons. In groundwood, 56,000 tons. Miscellaneous, 9,000 tons. Those are pretty small reserve figures for this industry.

Export figures last year were practically nil, on account of our own domestic position. When home inventories are sufficient, exports will again be apparent (if the world buying conditions are then favorable). With 65,000 tons of less pulp in the aforementioned inventory period, this country was in no position at all to quote on foreign trade. Sulphite was the cause of this situation. New woodpulp production in 1946 was nominal, and not a cause for rejoicing in the trade. All the hills-and-valleys of charting sulphite woodpulp were downhill. With inventories below consumption so sharply, we have, indeed, a poor prospect for the year in woodpulp.

Domestic woodpulp consumers are in the most favorable position just now. Those depending upon imports are not, as is clearly visible. New England mills, producing their own pulp, are all set for favorable business. But the overseas market buyers are looking—still looking—for those expected ships. It is not anticipated that more than 600,000 tons of Scandinavian pulp shall be shipped in 1947. Fuel shortages continue to restrict the northern European producers to a scale around 55% of normal. So it is believed that this country shall end the year with another short inventory, this time of around 200,000

Inspecting the Paper as It Goes Through the Mill

(Courtesy, The Byron Weston Company)

tons. Mill after mill reports being unable to obtain any market pulp at all.

With total receipts of waste at 8,895,000 short tons (divided into waste paper at 7,487,000 tons; rags, 427,000 tons; other waste at 981,000 tons), the supply situation is very close to the consumption total. Because consumption was 8,680,000 tons in 1946 (divided into waste paper at 7,296,000 tons; rags, 402,000 tons; other waste at 983,000 tons). This caused inventories January 1, 1947 to be: in total, 1,067,000 tons; (with waste paper at 504,000 tons; rags, 77,000 tons; other waste at 486,000 tons).

Combined picture shows the waste material situation to be like a charted pipe organ, with the pipes ever ascending to the top of the 9,000,000 short ton pinnacle. Waste is second only to woodpulp in mill importance. It replaced a goodly portion of the short side in woodpulp from abroad, too. Yet the inventories show a 54% gain in quantity of waste on hand January 1, 1947, over the same time last year. There was no especial "war drive" to accumulate waste material, as during the war. Yet the prices paid, plus the inspired activity of various groups to obtain funds for special purposes, brought out much more waste than expected, earlier in the year.

Closer cooperation, also, is the answer, with waste paper dealers cementing a better relationship with the mills, and a mutually higher regard for all concerned in the trade. Yet, notwithstanding the demand of American mills, 71,000 tons were sent abroad in 1946, a large supply of waste paper, considering the situation here. But this was, in fact, less than 1% of the year's domestic supply.

Paperboard requires 58% of waste paper for its production. Even in sanitary paper the use of waste is fully 10%. This also applies to industrial paper. Book paper uses 20% of waste; building paper 38%. They also use considerable woodpulp, so it is easily seen that the two products wash hands.

To mention an isolated instance of local supply of waste paper, it may be interesting to know that the Parent Teachers Association, in Washington, D. C., in full cooperation with the newspaper originating the idea, gathered 27 million pounds last year through school children, realizing some $172,000. Perhaps, if left to regular commercial channels, this waste would not have been recovered—yet.

In 1939, only 31% of waste was used in paper and in paperboard. Last year, this percentage increased to 35. And, as a comparison, woodpulp, at the same time, fell from 61 to 58%. This is evidence of the counter balancing in woodpulp and in waste.

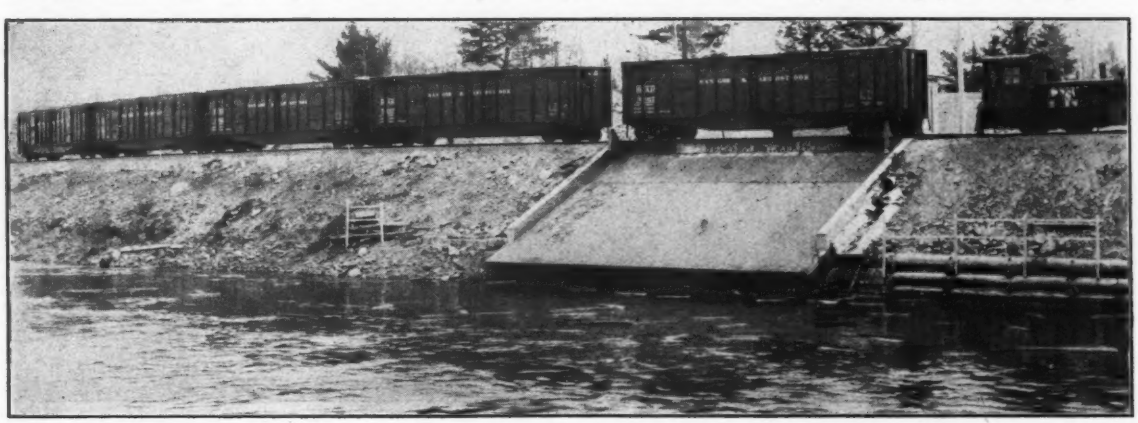
Although the writer, of this portion of the record in paper and its production, previously mentioned the part of "rags-to-riches" in paper industrial use and output, it remains for official sources to confirm the opinion that rags *are* riches. It is said that much of all rag stock are old rags, the kind gathered from numerous sources in every household. At one time, it has been related somewhere, rag bags were even ornamentally made and located in primitive pioneer parlors, so the ladies of the house could handily save every scrap that appeared useless, otherwise. And 40% of rags, it seems, go back into building paper, to make new homes. And about 20% of new cotton rags, where obtainable, go into writing paper and envelopes, perchance, of the lady who also saves the rags.

Roofing felt requires a rag content. And this was especially difficult to obtain in 1946. This is about 70% of the entire building paper industry, so the hardship in rags was serious. Building paper increased in production fully 15% last year, therefore the rag shortage—or, rather, the price increase of rags—was like taking the roof off the head of the household that had saved the rags originally.

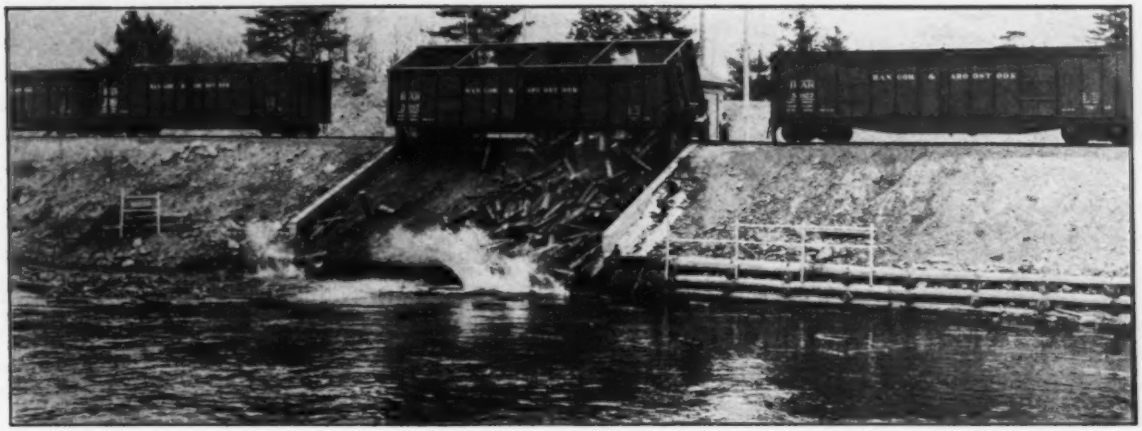
With rags again coming from abroad to the amount of 15,000 tons last year, the pre-war percentage of all rag supply of 12% may be regained. But we also

Cars of Pulpwood Preparing to Unload at Chute

This view shows one of the new cars spotted on the cradles and uncoupled, ready for unloading.



(Courtesy, Great Northern Paper Company)



(Courtesy, Great Northern Paper Company)

Down the Chute Goes the Pulpwood

This view shows the car tilted to a 40°-angle, with the last of the load being discharged. Doors on the inner side are open for inspection of the car.

expected 13,000 rag tons last year. Of this amount 3,000 tons were sold at over $50 the ton, and 10,000 tons of secondary rags at less than $50 the ton. Foreign buyers still want our cotton rags—but so do we.

Making 19,179,000 short tons of paper, of all kinds here in the United States last year, as mentioned before, we can now break this down like this: Newsprint, 775,000 tons; groundwood printing and specialty paper, 771,000 tons; book, 1,919,000 tons; fine paper, 1,143,000 tons; coarse wrapping and bag, 2.715,000 tons; special industrial paper, 292,000 tons; sanitary paper, 840,000 tons; tissue, 182,000 tons; absorbent, 99,000 tons; building, 1,011,000 tons; all types of board, 9,432,000 tons (divided into: container, 4,303,000 tons; folding box, 2,669,000 tons; set-up box, 594,000 tons; card, 85,000 tons; building board, 1,243,000 tons; miscellaneous, 537,000 tons).

Production of all paper, plus imports, minus exports, runs to a 1946 total of 22,500,000 tons. That was an increase of 14% over 1945. Per cap use increased, also, from 282 pounds in 1945 to 320 pounds in 1946. And that was 13.5%, too. With a paper production gain in 1946 over the previous high in 1941 of 7%, the industry is, indeed, at a high level. Industrial paper gained 23% in 1946 over 1945. But newsprint was 18% less than in 1939; 25% less than 1941, and it was only 7% above the figure for 1945.

Chemicals were shy in 1946, as the industry well knows. But the pulp situation, as previously mentioned, was the greatest handicap to total production in 1946. Therefore, when it is said that newsprint produced in 1946 reached 775,000 short tons, with 3,492,000 tons imported, 28,000 tons exported, and the total supply set at 4,242,000 tons, it is seen that the newspaper situation was, as frequently reported, most serious for the paper industry, as well as for the publishing field. Inventories, January 1, 1947, were only 308,000 tons. Publishers had 293,000 tons of this, mills had 15,000 tons, so it can be seen, too, that the mills were not holding out on the publishers, as some careless people said. Consumption of newsprint for the year, then, was 4,296,000 tons.

Ration of total paper production in 1946 was 101.1%, in relation to capacity, compared with 89.7% in 1945, according to the American Pulp and Paper Association. Plans for increasing capacity for the next year and more include 3,000,000 additional tons. For five years of 1940-5 the rate of increase was less than 500,000 tons annually.

It is an outstanding fact that most of Canadian and New Foundland production of newsprint finds its way down here, of course. It appears to be running at around 83 to 85% of total Canadian production for the American publishing field. Government investigation of the shortages of newsprint merely goes to prove that the big city papers are usually protected, while the smaller newspapers catch-as-catch-can.

Book paper production was above 1945 by 28%. Groundwood was 21% higher in 1946. Fine paper achieved a 14% boost in 1946 production. In seven years, from 1939 to 1946, the record of increase shows 25% for book, 43% for groundwood, 58% for fine paper. Starch and casein were both shy in 1946, so the mills had added problems in production. Book and fine paper mills, in the east, had to reduce operating schedules to approximately a half week, in many cases. One of the reasons that printing paper took such a hike in 1946 was due to the relaxation of Federal control, so that advertising increases boosted the totals of practically all magazines and newspapers. Also, increasingly larger subscription lists expanded all publication to the bursting point.

New periodicals came out, manifold production of new books. Textbooks, hymnals, cut down during the war, again blossomed into large output, yet not enough for various educational and religious purposes.

More than a 10% reduction in paper merchants' and jobbers sales was caused in 1946 by the purchase of mills by large publishing houses, thus diverting output to other outlets, changing types of paper manufactured, and so on. Publishers protected themselves by purc asing such mills as they could to make coated and machine finished paper. One sale of this sort changed a newsprint mill to a coated paper outlet for more than 100,000 tons annually.

Production of glassine, greaseproof and vegetable parchment paper was 96,000 tons last year. Wrapping went to a seven month fiscal year production of 486,-000 tons; bag, same period, 320,000 tons; shipping sacks, same period, 315,000 tons; converting, same period, 353,000 tons; total, 2,715,000 tons of 1946. This was a gain of 13% for coarse paper production. Shipping paper was largely expanded during the war, so this built the resultant total up. It takes time to get this portion of the industry back on full peace production, with complete comparative figures for the full year.

Kraft paper, used so extensively by these industrial and commercial departments of the industry, was placed in a more secure position by the manufacturers expanding their converting operations. This was a necessary move in 1946 because of the conditions in the paper industry. It is believed that 149,-000 tons will be added to the kraft field, just so soon as the mills and machinery can be built. This will be divided into 140,000 tons of kraft, actually, and 9,000 tons of sulphite wrapping, inclusive of glassine. But it is extremely doubtful that the entire program shall be in practical production before 1948.

It is planned, also, to increase paperboard production in 1947-8 by 1,400,000 tons. Board mills are buying up box factories. Container manufacturers, too, are buying board mills, so they may be assured of running supplies. This situation also centers the converting picture, as more than thirty mills have been purchased by converters of paper products, likewise, so they may know that they shall obtain all the material they need. During the first six months of 1946, paper napkins, for example, amounted to 29,408 tons, highest production for all time.

For about six years, since 1941, bag manufacturers have been closing plants because of conditions inside the trade. Supply of bags, therefore, became increasingly short. But the production rate last year was 450 million bags, about 106 millions more than during the war.

Folding box production is also increasing. It is apparent that 1946 was a banner year for these manfacturers, says the Folding Paper Box Association. And the Fibre Box Association reports that container board, used in their box plants, amounted to 4,504,273 tons, weekly average of 86,621 tons, against 78,730 tons in 1945.

Apparently, the import-export picture is not changing much in the paper industry. Naturally, more pulp material is imported than exported, even as completed paper. Paper and paperboard exports of 400,000 tons in 1946 were less than 1945. But the previous record, of 250,000 tons exported in 1939, was easily passed. Previous to the war about one-fifth of all pulpwood was imported wood. Wood pulp imports then equaled about one-third of production. But now it is on the ratio of one-sixth. One-third of all the paper, minus paperboard, we produced was imported; this is still a fact. Of course, practically all this imported paper is in newsprint. From Canada, too, it is 97.5% of the imported paper total. It has been running at this rate (aproximately 98.8%) for some years.

Chemicals used in the American paper industry include eleven principal items. These are bleaching powder, caustic soda, soda ash, chlorine, salt cake, casein, sulphur, rosin, alumina sulfate, china clay, and talc.

To make all this paper, to work in the numerous phases of the industry, 366,000 employees are involved. But this in 1946 was an increase of 37% over the 1939 average of 265,000, and represents a gain of 42,000 for last year. These figures do not include, however, the logging operations.

It is, indeed, a huge industry. And the pulp division is the vital and basic department of the business. Without pulp no paper could be made. Without the improvements of the past seventy-five years, during the existence of the PAPER TRADE JOURNAL, this great quantity of paper could not be produced. It is closely linked with technical developments of an industry in which both worker and employer may be proud to serve. For they serve the public—the consumer.

CHAPTER XIV

For Nearly Seven Centuries Watermarks Have Distinguished Paper

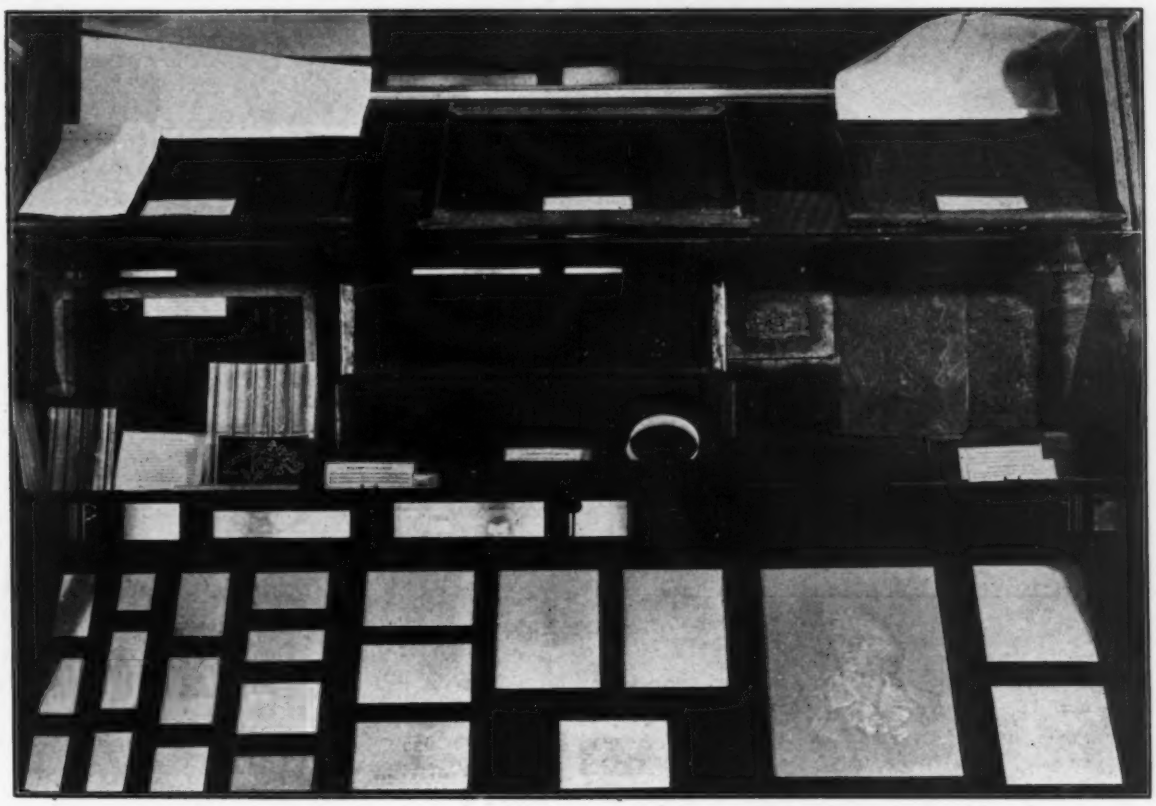
THERE is considerable difference of opinion in the paper industry about the exact origin of watermarks. That is, as to the date, the time, the place. That they may have been crudely drawn and used previous to the thirteenth century is a surmise of some antiquarians, but not of current record. First authentic watermark, according to testimony in this history of paper, occurred in Italy in 1282, A.D. Then there was another at Provence, France. It seems that a sort of an outcast colony of paper makers worked there. They were transient Jews, and what the Roman Catholic church called "heretics." Efforts were made by the church to suppress them. But they went right on, making their crude paper with a watermark, the record of which is lost in antiquity.

Italians are also credited with mor eearly watermarks, but definite proof of these marks appear to be lacking. Some few discoveries have been reported, from time to time, of ancient watermarks in Italy. They are, indeed, old marks, dating from the famous Fabriano mills, no doubt. Also of the Sicilian period of development of the industry, when the kings of Sicily gave aid to their paper makers. In gratitude, the paper makers undoubtedly placed their rulers' insigne on their paper. But this is not so far back as the French notation at Provence, according to the records.

Also, the French evidently made watermarks in

665 Years of Watermarking

A section of a case showing the tools and appliances used in making watermarks. On the top shelf are displayed hand-moulds formerly used in paper mills in Italy, Sweden, Germany, England, Holland, and France. On the center shelf are shown moulds and watermarking devices used in making English and American bank-note papers. In the lower part of the case are displayed actual watermarked papers from the beginning of watermarking in Italy, in 1282, to the elaborate light-and-shade watermarks of the present day.



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

their paper in the thirteenth, and, continuously, no doubt, in the fourteenth centuries. For the record of marks is quite correct in the early days of the fourteenth, as it is in the thirteenth. Limited number of watermarks have been found, it is true, of that period. Religious orders had them in their works. Local and royal courts and government agencies had them in their law and record books. They were crude, of course, but so was the paper. Yet the very fact that the paper, in many cases, has endured to this day, in various museums, here and abroad, indicates that the paper, if not so fine and precise, sheet by sheet, was, at least, of quality in original pulp.

So the watermarks of that age have come down to us as memorials of a paper age when men labored valiantly to improve their paper, and also, to identify it. If not, they would hardly have placed their signs on the crude off size, off colored stock. They would have, as they did later, made no sign at all that the paper they were producing was worthy of a watermark. Additional watermarks were found, again, in the year 1330, A.D. At that time a French book of accounts was located at Bordeaux, and the paper on which the bookkeeper had written was clearly watermarked. It was a ram's face, and the book and paper was the property of the constable of Bordeaux.

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

A Watermark Wonder Man

Sir William Congreve, who made the original color watermarks in 1818, was the inventor of that form of paper marking. Twenty-four such papers were submitted to the Bank of England in 1819, and all British banknotes of today are the direct result of Sir William's experiments.

From the diverse watermarks that followed, current investigators are able to know the precise age of the paper, also the country of origin, sometimes the mill, or the maker's name. Too, quite frequently then and since, the actual authenticity of the paper and the writing thereon has been proven or disproven, both in court and out. Accordingly, the Federal Bureau of Investigation, the famed "F. B. I.," in Washington, D. C., carries a most complete file of watermarks. Paper experts and chemical analyists, in that and other bureaus of similar character, are therefore able to determine, almost uncannily, the source and the period of the written document, no matter what it may be.

Also, the manufacturer of watermarked paper constantly benefits, today, from the persistent use of his water or trade mark. Consumers of paper now buy and use paper, to some extent, because of the existence of the watermark. Royal courts, of old, established certain watermarks, and no one was permitted to imitate them. Likewise, royal permission was granted to certain old time hand mills to create and continue to use a private mark for a type of paper, to distinguish the guild, the famed location of the mill or the city.

By impressing the paper pulp with the watermark, the design desired is permanently set in the completed paper sheet, or book. This is accomplished by making the watermark design in the wires over which the pulp paper passes, thinning the pulp, automatically, as the paper passes over the design, and thus throwing into bold relief the watermark. From the youngest school boy, who possibly and usually, collects postage stamps, for example, the watermark on Government paper, "U. S. P. O." United States Post Office, indicates, at a quick glance in the light, that the paper, therefore the stamp, is genuine.

And a story is also told of the use of a watermark by the Internal Revenue Bureau of the Treasury Department, at Washington. Every Internal Revenue stamp, of a bluish-green color, bears those magic initials, "U. S. I. R.," or United States Internal Revenue. Some years ago, quantities of cigars were sold below cost by a Pennsylvania manufacturer.. Other manufacturers objected to this, but, apparently, could do nothing at all about it. Placing their case before the Bureau of Internal Revenue, the cigar manufacturers requested an investigation as to the authenticity of the stamps themselves. But the Government agents, the then Secret Service of the Treasury Department, found the stamps perfect — or almost so.

Anyhow, one agent was suspicious. Yes, the Revenue stamps were all properly watermarked, "U.S.I.R." But, still, even with evidently genuine engraving of the stamps, something appeared to be the matter. So this agent followed through. He had

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology).

Famous Watermarks on the Windows

In the Paper Museum the windows are arranged in the Japanese manner, showing various watermarks dating from the beginning of the art to the finest light-and-shade papermarks of the present day. Work of the most renowned watermarking artists, of all countries and all periods, there may be carefully studied.

a cold, and he purchased a bottle of cough syrup. He told the druggist he wanted a bottle with a bluish-green label. That label resembled the color of the Internal Revenue stamp. And, when soaked off the bottle, lo and behold: the cough syrup had a brand label, "Uncle Sam's Internal Remedy," with the "U.S.I.R." watermark.

That was enough for the Secret Service man. He found out where that concern was located, seized the labels, all the paper bearing that Government watermark, "U.S.I.R.," and then looked for the paper mill. He found that, too, with the aid of a printer, who made the labels. Innocently,t the paper man had made the watermark for the medicine man. But the medicine man was also the cigar man. He had used the cough syrup tor a blind, and was really using the watermarked "U.S.I.R." paper for printing imitation Internal Revenue stamps, with the aid of an engraver who had formerly worked for the Bureau of Engraving and Printing, therefore knew how to engrave almost perfect Internal Revenue stamp designs.

Designs of engravers, no matter how precise, are

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

100-Year-Old Type of Watermarks

Two watermarked papers made by the light-and-shade process that was invented by William Smith, an Englishman, about 1840. Each of these examples embraces about 460 square inches, and were formed on hand-moulds. These specimens made by T. J. Saunders, London, England.

no more important, then, to the Government, nor to the paper mills, than the watermarks. Fundamentally, the watermarks precede all designs, all engravings. For the watermark, thus impregnated in the pulp, and, therefore, in the paper itself, is a guarantee established by not only governments, but by banks, all financial firms, as a rule, and by many manufacturers of products carrying a necessary guarantee of the goods through the label, as in medicines, chemical products, valuable processes of all kinds.

In Switzerland, the paper mills originally used watermarks to designate types of paper, thus: shield, crosier, lion marks indicated three different qualities of paper. And the watermarks of the bell, shell, grape, jesus, great eagle, and crown indicate sizes of that paper. In 1498 A.D., it is said that an English mill owner, John Tate, produced hand made paper with an eight pointed star within a double circle. That mill was at Hartford, England, and was either the first or second earliest mill in all England. He died in 1514, A.D., as related elsewhere in this record.

In England, too, type of paper (and frequently quality thereof) was indicated by the watermark. For example, the watermark of the 1539, A.D., so called hand paper was a hand with a star at finger ends. In Germany, at about this time, the Ravensburg mill used a watermark of a tower. This indicated fine paper. Ox head watermarks showed second quality paper, while the hunting horn was a watermark for paper of only ordinary material. France made mill owners place watermarks on paper, by royal edict, to show quality. This was renewed as a Government edict in 1739 and again in 1741. Date and name of mill were also ordered to appear in the watermark.

In England in 1530, A.D., a jug or pot watermark was used to indicate pot paper. Fool's cap came later as a watermark, too, to indicate a type of paper. A figure of Britannia also was used as a watermark for quality indication. Henry III, in 1582, ordered all mills to print (as a watermark) name and trade design. Two initials and surname were ordered by the king on each sheet.

In Troyes, France, in 1538, the watermark was ordered by the Parliament to be a guide for paper quality and size. Also, mills were warned that counterfeiting would not be permitted, as some masters imitated the products of their competitors. Parliament decided a case in point when Jean Pietrequin won a verdict for his Troyes mill. Pierre Bertrand and Jean Bourbon, who operated a mill at Mussy-sur-Seine, imitated the unicorn and ox head of Pietrequin. And, as the Bishop of Langres had graciously permitted Pietrequin to use these two famous watermarks, the decision against Bertrand and Bourbon was evident.

In Italy, too, counterfeiting of watermarks persisted. Both France and Italy tried to stop it. In France, the ordinance of Louis de Tignonville, bailiff in 1398, is translated: "Forasmuch as it has come to our knowledge that the paper makers and their workmen in the said bailiwick have lessened or made to lessen and diminish the molds in which they make the said paper, and, consequently, this paper is reduced in size about one good finger in width and breadth, and that they practice counterfeiting day in and day out and use the signs of one another, and sign poor and medium stock as if it were better, to the great deception of the people. Wherefore, we have ordered and do order henceforth that the said paper shall

have the dimensions fixed by us or by the provost of Troyes for the said workmen, and that none of them may make better paper than the others, each of them shall have different signs with which to sign his paper, and thus shall distinguish the best from the medium."

Charles VI, of France, ordered in 1409 that the assizes see that sizes of paper were maintained. "And that they shall be measured and signed by the provost of Troyes by a sign or mark that will be ordered for the purpose."

But mixed designs for watermarks were numerous. For example, again, the popular fleur de lis was used by mills in both Italy and in France. To arrange watermarks by mills and by dates was almost impossible, there were so many, and so many of similar nature, in varying shapes and sizes, with similar designs. So Briquet, the antiquarian, arranged them in alphabetical order. He said, too, that an early watermark, in 1282, A.D., was from Italy. It was the Greek cross of the Bologna mill.

City of Colle had old watermarks. Human heads were used as designs. Nespolo, in 1356, A.D., had a watermark of medlar fruit from the nespola. In the Padua municipal archives are found watermarks of 1353 and 1354, A.D. They are wheels of the arms of the lords of Carrara, rulers of the republic of Padua. Fabriano mills in Italy used watermarks at the end of the thirteenth century. At that same time in France they were using the fleur de lis, the rooster, and the heart. Puy mills, at Auvergne, used the heart. Watermarks from the Ambert region date back to the fourteenth cenutry. Masters of mills were required to use personal initial marks. Also the surname was ordered, up to the end of the seventeenth cenutry. They were likewise ordered to place the year the paper was made in the watermark.

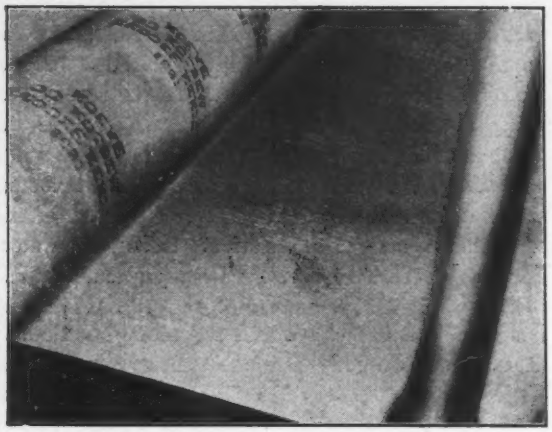
Epinal put its arms in its watermarks. Fribourg also did the same in the fifteenth century. Difference of opinion about the origin of the bull's head watermark waged furiously among the paper antiquarians. Guterman said it went back to 1301, A.D. Briquet said 1321. But the approximate timing is similar. Hassler thought 1324 was the proper date for its origin. It was believed that this bull's head was the watermark of the guild of painters. Their patron saint was Luke, and the ox head was their symbol. Bull's heads, with no eyes, came from Ravensburg, it is believed.

Much later, in England, along in 1540, A.D., Henry VIII had his famous fight with the pope. So he impressed a watermark of a hog with a mitre. In 1649 the watermark of the very finest royal paper had the design of the royal arms. That was where the aforementioned fool's cap with bells came along. It was substituted for the royal arms, in contempt for the king. Fools cap has been the size of such paper ever since. And the British Parliament, itself, still has paper of that period with the fool's cap watermark in its records. Post paper, as also previously related, took its watermark from the post horn. This was used as a watermark after the establishment of the general post office in England. That may have been after 1670.

Light and Shade Watermarks

Watermarked papers of unusually large size, depicting the light-and-shade portraits of the discoverers and explorers of Australia. Original moulds, and the paper made upon them, were made about forty years ago by the T. J. Saunders Company, London, England. With light-and-shade watermarking it is possible to reproduce any degree of tone. These two sheets were made on hand-moulds, as were all the ancient watermarks of qual ty paper in both Europe and America.

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)



(Courtesy, The Byron Weston Company)

Dandy Roll Making the Watermark

Not much has been said, by historians, of the progress of watermarks during the era when hand made paper gave way to the machine. So many machines and so much equipment were patented, during the next many years, that the entire attention of the industry appears to have centered on production, rather than upon mere identification. Watermarks were used, constantly, but a definite record of their type and kinds is evidently not fully available.

With the advent of the mighty Fourdrinier machine for the expansion of the paper industry, along in 1800, the establishment of watermarks was forgotten in the remarkable development of output, improvements in processing, the approach of new technical methods. Watermarks were still regarded as important, evidently, as practically all notable mills used them during this long passage of time.

Many mills continued to use the watermarks of the bygone centuries. With the success of paper manufacture in American, after 1690, and during the early days of the eighteenth century, the new mills established new watermarks, valuable trade marks of entirely new types of paper. These new enterprises did something more. They told the public about their watermarks. They asked consumers of paper to look for them.

It is shown that the Massachusetts paper mill of Caleb Burbank made antique laid paper with a watermark of the State of Massachusetts and the accompanying date of 1804.

In fact, along in 1823, American newspapers complained to Congress that this august body was using a watermarked paper which indicated the paper was made in France, not in America. Its watermarked slogan was "Napoleon empereur et roi, 1813." Some one must have looked through that paper. Today, Congressional paper, in fact, all Government paper, is immediately identified with its Great Seal eagle. Also, the paper itself is of excellent quality, as a rule.

In 1828, two patents, taken out in England, had to do with the molds and the machine wiring. But no immediate attempt was made to change the watermarking methods, which still were designed and manufactured in the ancient manner. Yet many of the then new style watermarks appeared to be more regular, straighter, because the flow of the pulp over the wires was now made more uniform.

This was accomplished by John Marshall. He used the wire-covered roll, which we now call the "dandy-roll." He had worked on the job since 1826, just about 14 years after the Fourdinier was invented in France and made in England. Marshall was of the famous paper family of T. J. Marshall, who made paper moulds. They had been established in 1792. It is supposed that the dandy roll got its odd name from the fact that a workman, seeing the result of its work, said: "Ain't that a dandy?"

Evidently, Marshall failed to take out a patent, as the papers were eventually given to John and Christopher Phipps. This was January 11, 1825. Hand work was at first required to make the watermark on the dandy roll. Simple pliers bent the wires. These wires were so manipulated as to form the design, whatever might be desired. When the dandy roll idea came into use on the machine, T. A. and C. D. Marshall used solder to fasten the design.

William Henry Smith invented the light and shade watermark. In handmade paper the watermark is produced by holding the pulp over the mark, while dandy roll marking places it above the pulp. So the handmade paper watermark is usually sharper, clearer. It is also necessary to have especially good pulp, finely macerated, beaten to a mass fibre that takes the mark easily, without flaws. In a case, years later, of the Berkshire Mill of Crane & Sons plant, at Dalton, Massachusetts, the letter "B" became detached from the roll, and much paper was watermarked "erkshire Mill."

In handmade paper it is a fact that watermarks in circles, for example, may be made perfectly round. In machine or dandy roll marks the circle (or other mark) may be stretched or slightly changed by the shrinkage or stretching of the paper in the pulp. Also, the distortion comes from the shape of the dandy roll, which alters the circle, mechanically, about three-eighths of an inch. Weight and grade of paper being made also affect the stretch or shrinkage of the pulp in process. Usually, in drawing the dandy roll watermark design, allowance is made for the difference in these factors affecting the final result.

Many cases of alteration of the watermark or trademark in the paper have caused untold grief to falsifiers of wills, leases, agreements, checks, and other legal papers. Beginning with the famous Shakespeare case, along in 1752-1770, and in 1777-1835, when spurious documents were found purportedly bearing the chirography of William Shakespeare, of Stratford-on-Avon, England, the complete detection of the frauds was discovered because of the manipulation of the paper

Birthplace of "PAPER MAKERS TO AMERICA" — *Etching by* H. S. FOSTER

CHRONOLOGICAL HISTORY OF THE MEAD CORPORATION

1846-1946

1846 Colonel Daniel E. Mead becomes a paper manufacturer and as a partner helps to found Ellis, Chaffin & Company, Dayton, Ohio.

1856 Ellis, Chaffin & Company changes its name to Weston & Mead.

1861 Weston & Mead becomes Mead & Weston.

1866 Thomas Nixon (a member of an old paper-making family of Philadelphia) acquires Mr. Weston's interests and becomes an equal partner in the new firm of Mead & Nixon.

1881 Daniel E. Mead acquires full ownership of Mead & Nixon and changes corporate name to The Mead Paper Company.

1885 The Mead Paper Company purchases the pulp and paper mills of Ingham Mills & Company, Chillicothe, Ohio. (Erected in 1847.)

1905 The Mead Paper Company is re-organized by Mr. Geo. H. Mead, with the name of The Mead Pulp & Paper Company, incorporated under the laws of Ohio.

1907 Equipment of the original Dayton plant of The Mead Pulp & Paper Company is moved to Chillicothe, Ohio.

1912 Geo. H. Mead is elected president of The Mead Pulp & Paper Company.

1921 The Mead Sales Company is formed to sell, merchandise and advertise the paper, paper-board and pulp produced by Mead and other mills.

1926 The Kingsport Pulp Corporation, Kingsport, Tennessee, becomes The Mead Fibre Company.

1928 The Mead Paperboard Corporation is organized, controlling a number of paperboard mills in Virginia, North Carolina and Tennessee.

1930 The Mead Corporation is formed, embracing fourteen divisions and subsidiaries for the manufacture of pulp, paper, paperboard, and chestnut extract. There are plants in eight states and 4,100 people are employed.

1932 The Mead Corporation assumes management of Philadelphia's Dill & Collins, a mill that traces its early history to 1690, when William Rittenhouse established America's first paper-mill.

1934 The Mead Corporation acquires the Wheelwright plant in North Leominster, Massachusetts, where, in 1880, mill bristols were first manufactured in America.

1937 The Brunswick Pulp & Paper Company, Brunswick, Georgia, is organized jointly by The Mead Corporation and Scott Paper Company.

1942 The Mead Corporation acquires the Escanaba Paper Company, Escanaba, Michigan, adding groundwood specialties to its line.

1943 The Mead Corporation acquires the Manistique Pulp and Paper Company, Manistique, Michigan, comprising a groundwood pulp and paper mill.

1946 The Mead Corporation acquires the plants of Columbian Paper Company at Buena Vista and Bristol, Virginia. Also with Inland Container Corporation, of Indianapolis, organizes Macon Kraft Company, to operate a kraft paperboard mill near Macon, Georgia.

1947 "Paper Makers to America" inaugurates one of the industry's most progressive post-war plans.

MEAD papers
EST. 1846

THE MEAD CORPORATION

ACTIVE PLANTS

Chillicothe, Ohio
Kingsport, Tennessee
Lynchburg, Virginia
Philadelphia, Pennsylvania
Leominster, Massachusetts
Escanaba, Michigan
Manistique, Michigan
Buena Vista, Virginia
Bristol, Virginia
* Brunswick, Georgia
* Knoxville, Tennessee
Harriman, Tennessee
Nashville, Tennessee
Sylva, North Carolina
* Macon, Georgia

* 50% Ownership

STANDARD MILL-BRAND PAPERS

MEAD papers
EST. 1846

Mead Bond (w) Mead Ledger (w) Moistrite Bond Mead Mimeo Bond (w) Mead Duplicator (w)
Moistrite Mimeo Bond Moistrite Offset Process Plate Enameline Envelopes by Old Colony

Dove Mill Bristols

Superfine Bristol Olympic Bristol Ionic Bristol Fiberfold Bristol Strongheart Index
Made(w)right Index Ionic Blanks Highlight Coated Bristol Spotlight Cover Leatheright Cover

D

Black & White Superb Dull Coated Superb D. C. Cover Printflex Coated Printflex Cover
Dulbrite Semi-Dull Multykolor Canterbury Text Canterbury Cover
De & Se Tints Dilcol Translucent Suede Book

MEAD SPECIALTIES

Bond — Sulphite
Book — Antique
E. F., Super
Eggshell
Bulking
Groundwood
Bread Wrap
Carbonate
E. F. and Super
Catalogue
Coated
Machine Filmed
Corrugating — .009
Envelope
Fibre Board
Chestnut
Cover Board
Book Board
Industrial
Hanging
Base Stock
Label — Coated
Map
Mimeo
Offset
Bleached Kraft
Coffee Bag
Unbleached Kraft
Laminating
Register Stock
Sales Book Stock
Tablet Paper
Tariff
Test Liner
Waxing — Fine
Waxing — Kraft
Wood Pulp Board
Drinking Cup
Plain and Impregnated
Groundwood Specialties
Wet Strength Papers
Impregnating
Moisture Vapor Resistant
Laminated Papers
Technical Papers

DILL & COLLINS SPECIALTIES

Gumming and
Other Specialties

WHEELWRIGHT SPECIALTIES

Mill Blanks
Papers and Board
Colored
Covers
Duplex Board
Bristols — Printing
Bristols — Index
Photo Mount Stock
Decorated Board
Calendar Board
Decorated and
Embossed Specialties

MEAD • DILL & COLLINS • WHEELWRIGHT

SALES OFFICES

THE MEAD SALES COMPANY • DILL & COLLINS, INC. • WHEELWRIGHT PAPERS, INC.
230 Park Avenue • New York City 17

NEW YORK CHICAGO PHILADELPHIA DAYTON BOSTON LEOMINSTER

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Commemorative Watermark of 1874

A watermark made in 1874 to commemorate the 400th anniversary of the establishment of the first printing shop in England, by William Caxton, whose portrait appears in the center. The house in Westminster, where Caxton is thought to have done his printing, is shown at the top center. There were no paper mills in England during Caxton's time, so all of the paper had to be imported from the Low Countries. Caxton's successor, Wynkyn de Worde, was the first printer to make use of English-made paper, the paper having been made by John Tate, who setup the first very crude hand made paper mill in England, between 1495 and 1498.

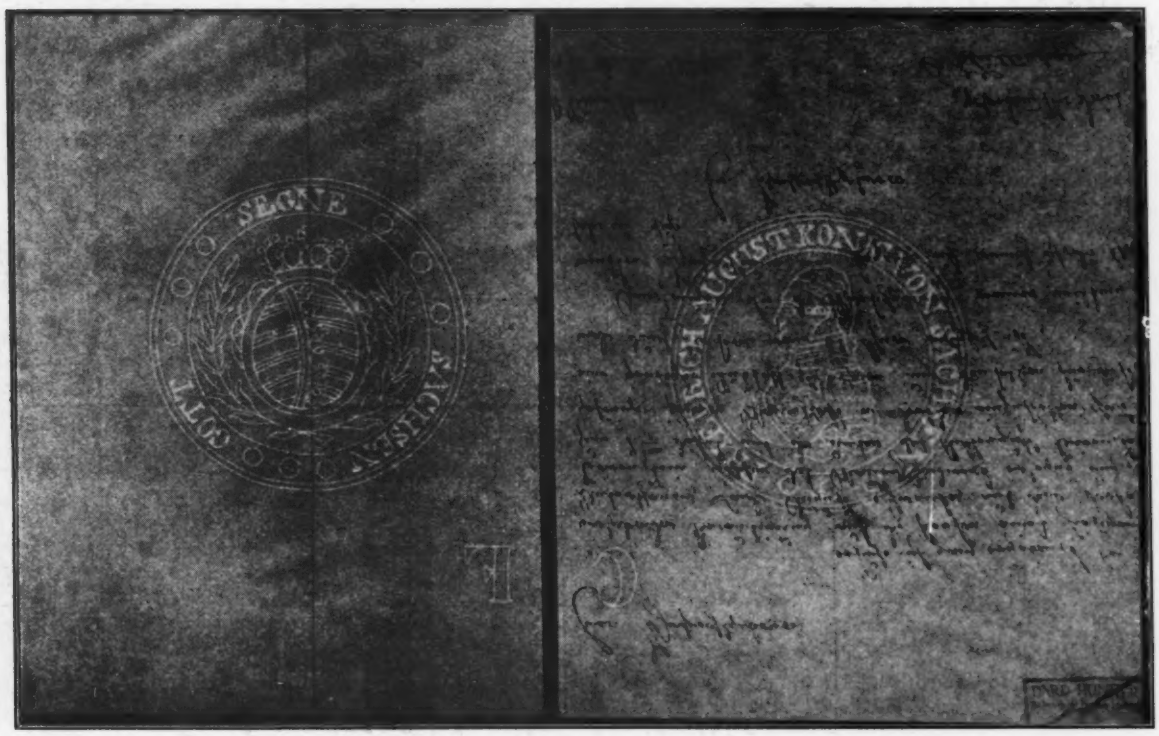
with the original "jug" watermark. Even a supposedly Shakespearian play, new to the famed Drury Lane Theatre, in London, was produced from paper bearing the false lines of the famous bard. In 1805, William Henry Ireland confessed he had gone to considerable trouble to obtain the old "jug" watermarked papers of the Shakespearian period, to confuse the scholars. Jug and pot paper, so watermarked, was a feature of the time, and Ireland obtained it through a bookseller, who permitted him, innocently, to tear out pages from old volumes bearing the correct watermark of the period on which he wrote the fraudulent Shakesperian letters, receipts, and other papers.

Other now famous cases in court came about through watermarks. One was the final will in the Cloth-Garrett case, with a reversed watermark. This will was written upon paper watermarked "W S & B Regent Bond," made by the Southworth Paper Company, Mittineague, Massachusetts. But the forger had not allowed for a peculiar change in the mark, which, previous to 1900, had been merely "Regent Bond W S & B," a reversal of the fraudulent document.

Also the Koester-Jennings case, with millions of dollars involved in a will of 1918, where the paper bore the watermark "Artesian Bond," made by the Whiting-Plover Paper Company, Stevens Point, Wisconsin. But, again, the claimant, Koester, had failed to find out that this particular paper had not been made until two years after he had dated the upset will.

Such cases are quite numerous. And only by precise knowledge and experience, plus diligent search, are facts unearthed which sometimes lay low the perpetrators of these frauds. But the real worth of watermarks, today, is in the universal acceptance of certain advertised and noted marks. "Bonds," "Linens," "Ledgers," and all sorts of legal cap, use watermarks of permanence. Manufacturers of paper have, over the years, come to realize that they thus possess a most remarkable manner of trade-marking their products. Brands of all kinds, in many industries, may be established and maintained, through advertising. But it is only the paper mills that have at hand the means of impregnating the trade name in the product itself, "inside" the product.

As one advertiser, in another line, has long said: "It's a little thing to look for—a big thing to find!"



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Stationery 127 Years Old

A specimen of stationery from the 1820 period, made in Germany. This is an example of earliest of the portrait watermarking made by using singles wires. Light-and-shade watermarks were a later invention, as related elsewhere in this record. Dandy roll marking changed the entire processing of watermarkings. Machine mills rapidly adopted the quicker and more accurately perfectionized dandy roll, of which much has been mentioned herein. It is a long, long story of ceaseless endeavor to improve and quicken the watermarking process

CHAPTER XV

Without Forests There Would Be No Pulpwood

SHAKESPEARE said it: "This, our life, exempt from public haunt, finds tongues in trees, books in the running brooks, sermons in stones, and good in everything" Before the Bard of Avon wrote "As You Like It," or that part in act two, scene one, he may have observed his primeval English forest before foresters of the Robin Hood era lived in the dell, previous to the coming of the sheriff of Nottingham, mayhap to take a young rogue who had fallen a tongued tree. Those "tongues in trees," mentioned by the Stratford commentator, actually exist to foresters. Woodmen may not have much sentiment in practical logging, but they do have a certain respect for the trees they cut, and for their ultimate purpose. To know, then, by experience, they must know their trees, and the story they have to tell.

Three men, coming at sunset from a hard day's work in the forest of Maine's tall trees, with singing saws bent to their backs, sharp axes and heavy sledges and wedges in their hands and on their shoulders, looked liked pigmies or gnomes in the gloom of the woods. But they had accomplished their day's work, and were homeward bound—or, at least, to the loggers' camp on Saw Mill Creek. They had added their stint of daily cords to the solid stacks in the Autumn woods, awaiting the very short six weeks in January-February when the sturdy sledges would move their stacks over the snow of the tree trails to the nearest rails, thirty-two miles away.

In former days, with the desired timber closer to the water, the logs would have been floated down on the melting ice to the paper mill. But, today, with spruce and hemlock, poplar and balsam, shrinking

Limitless Areas Await Pulpwood Gangs with Their Singing Saws

(Courtesy, International Paper Company)

backward into the maze of the higher hills, and tractors had to be depended upon to take that timber to the rails. Pulpwood is pulpwood, today, and the forest that once met the river is now almost on the slope of the mountain, especially the hemlock and poplar. Spruce may be found on the lower reaches, with some cedar and some balsam, aspen. But the scattering of balsam and spruce on the hills is also desirable, and must be cut.

If Maine and New Hampshire, of ancient New England, once furnished sure stands of timber to hungry mills, so did New York, and most of the Middle States. But the stumpage of the north country is silent testimony to the demand for paper which ran rampant over the White Mountains and the Adirondacks, years ago. Today, the cut must be along the Great Lakes; to Michigan, to Minnesota, to Wisconsin, to Ontario, over to the north and west, even to the Pacific, also to the newer sources of the tall, slender pines of the southland.

Great piles of logs, in Maine, available to eastern mills, were pulpwood of spruce and hemlock, balsam and poplar. Groundwood had to be spruce and poplar, alone. Straight trees, once so plentiful in the entire east and north, now appear to be scarce in that country of the Algonquin and Iroquois. Balsam is good for pulpwood in first and second growth, almost anywhere it may be found. But it must be found in quantity. It takes twenty cords of wood to make a flat car load. That's around 2,500 cubic feet, or approximately 42 tons, even on a gondola. It is a lead in half dry wood, as fully 55% must be available for pulping.

Spruce makes a carload in twenty-one air dry tons, groundwood. Twelve air dry tons of sulphite also comes from such a load. And it takes twenty ton cranes to handle such loads at the mills. Some ten cars of a total for two hundred cords, daily, may be thus stacked. And there are 3,000 cords in nice little piles twenty-five feet high alongside these sidings at the mills. This is paid for as it arrives at the mill, and by the cord, just like fire wood.

All the little hard working bugs, insects boring from without, get into these logs, unless debarked. Fungi also does it work, despoiling the wood for pulping as the

weather and time acts upon it. Peeled wood, of course, is much superior, as it dries more quickly, and does not give a bug the same chance it would have in the bark. Logs are four, eight, sixteen feet long. They have to be reduced to a cutting size of two, two and one-half, or four feet long, for easy handling in the mill. All the bark and imperfections (inclusive of knots) must be removed to prevent almost similar flaws in the pulp and in the finished paper. Ressing, for a half hour, does the trick. But they must be reexamined for escaped wood with wedges of flaws.

Next, to the chippers. Chips one-half inch by one-half inch, square, are one-sixteenth thick. When finished, they are closely stored in the handy chip bins, awaiting the grinders. These machines, hand or magazine, stone grind, are lubricated with water, for the screening. That is accomplished by a series of screens that remove all oversized lumps, slivers, or other objectionable matter. With a rotary motion the job is at last accomplished. Then comes the testing of the pulp for thickness, ready availability for the sulphite. That is made in a bath of sulphurous acid, plus calcium and magnesium salts. So to the chemical processing, with sulphur from the Texas Gulf. Through many and various machines in washing, screening, bleaching, beating, mixing, claying, sizing, coloring, jordaning, machining, screening again, forming, pressing, coating, drying calendaring, slitting, winding, sheeting, trimming, finishing, the loaded trucks now take the rolls to the cars. Each roll weights around a ton and one-half.

From log or tree, then, the paper has come down the line to the time Shakespeare's long silenced "tongue" may speak. It has only required a matter of weeks, or, at the most, a few months to do it. But it took just as nany years to rear the tree from which that pulp and the finished paper finally came. Strange fact, too, that China, as we have previously seen, introduced our so-called modern paper pulping to the world, yet China, of all countries, is almost devoid of trees for such a purpose at this time. In eastern China, particularly, and in all Manchuria, those valuable forest lands were almost entirely cleared of trees, years and years ago. On the contrary, Japan has always had a reforestration program that has gone along with its rather large de-

(Courtesy, Alaskan Aerial Survey Expedition, U. S. Navy Dep't, with Forest Service and Geological Survey.)

Timber Growth at Lake Reflection, Short Bay, Over Hill and Dale in the Tongrass National Forest, Alaska

mand for timber, not alone for pulping, but for all purposes, on the islands. As recently as the current MacArthur administration, the investigation of Japanese forests, and even of paper mills, in the numerous mountain valleys and along the hills, shows that reforestration, usually by women, closely follows the cut of the hardy woodsmen.

Of all the odd facts of this paper history is the statement that China, home of paper, is unable to supply pulp wood for its own requirements. So many articles in both China and Japan (and, in fact, of all the Orient) are made from paper that it would seem almost absolutely necessary that China should provide itself with enough trees for the purposes. Lack of them, in the forests that once protected the land and its people, now induces floods, famine, disease. In the whole area of the Orient, once described as the cradle of paper, the demand for it is about in fourth place of total world consumption. And it supplies only 40% of that demand. Because of China's economic and political troubles, plus its usual low purchasing power, it could not buy all the paper it needed, even before the war. Its production was hand made, to a very great extent, and is today. For printing, too, China must import its paper.

But Japan, notwithstanding the huge current demand for building paper products, can still pulp almost its own total supplies from its extensive island forests. Its paper production is still large. Mills are located in the northern part of the archipelago of the island of Hokkaide. Before the war fully 35% of the wood pulp of Japan came from Honshu mills, then producing 65% of the finished paper.

It was believed, during the war, that Japan might eventually hold Manchuria. By so doing it might then have had sufficient paper production from the established Japanese Manchurian mills. But China and Russia are now see-sawing over that territory, and the chaos of Communistic challenge to Chiang-ka-Chek eliminates that area from possible immediate consideration.

Peculiar fact, too, is that Australia, as great as its acreage is, remains dependent for woodpulp and for paper upon import, except for about 93,000 tons. This is also true of the Philippines. For no pulp nor paper production was apparent before the war, nor is it immediately visible now. Reconstruction plays no vital part in the Manila program to do ought else but export the hemp, so much needed, even in this country, from Manila. Only 80,000 tons of wood pulp were imported

by the Pacific islands, in total, ten years ago. During the war, these requirements increased, but were largely handicapped by events.

It is believed that 926,000 tons of finished paper were imported to the Pacific islands, as a group, previous to the war, except a small minus of 20%, home made. Lack of suitable timber, again, makes the Oriental world picture dismal for supply of pulping. All increases in requirements must be met, then, by exports from the rest of the world, especially from the Canadian and Pacific northwest. One source, now urged as available, is that of Alaska. With only 44.6% of total woodpulp for this country, produced here in 1946, and with 25.9% from Canada, another similar 25.9 % from Sweden, and only 3.6% from little Finland, it is apparent that the prospective pulp poundage from Seward's "Polar Bear Garden" would be welcome.

It is believed that the limit of woodpulp supplies has been achieved in Canada. And northern Europe simply cannot supply the deficiency. Paper and paperboard mills must look, therefore, to other fields, and Alaska appears to fulfill that purpose. It is indicated that the Tongass National Forest in Alaska, down to the southeast, contains spruce and hemlock sufficient to supply 800,000 tons of sulphite or sulphate, each year, for some time to come. Also, lots of water power is available in Alaska. It is said, too, that the eventual haul would be just about 1,000 miles from Seattle.

Lyle F. Watts, chief of the U. S. Forest Service, Department of Agriculture, says, now, that this country faces an acute timber problem. He says that we have actually wasted forestration for more than three hundred years, and that we now need more and more timber for all purposes. He remarks that only eight per cent of all our forests are getting experienced attention in private hands. Two-thirds of all timber is cut indiscriminately. Evidently, we don't know as much as the despised Japs, when it comes to reforestration.

In thirty-nine States the Government is starting woodland projects to increase yields. Millions of seedlings will be planted. But we are still overdrawing our timber account by 18.6 billion board feet annually. There are about 600,000,000 acres of forest in the United States. But private hands control 400,000,000 acres, largely small owners. Some 3,600 owners control an average of 5,000 acres, or more. Unless we follow the blazing of the trail of reforestration set by the Japs, we shall have mighty little pulpwood, even in Alaska, in twenty-five years.

Another odd fact, so far as the paper industry is concerned, has to do with the more or less recent opening of the southern forests for pulping, especially for

Are These Traitor Trees?

Loyalty to the Paper Industry Demands These Trees at Traitor's Cove, Tongass National Forest, Alaska

(Courtesy, U. S. Forest Service)

kraft. Since 1608 these forests have been quite apparent for their tall, slim, southern pine. All along the roads these trees are notable for their prolific generosity in supply of so-called naval stores, of tar, turpentine, resin, and the like. It is said that the original Cap'n John Smith, egged on by his Virginia Company in London, to send suitable supplies of "gold bullion, such as the Spaniards had discovered, or comparable of lieu thereof", finally shipped lumber and resin. It made the Virginia proprietors happy. In the past ten years, at least, the proprietors of interests in pulping southern pine have been likewise happy with their mills making kraft for containers of all sorts, especially bags and boxes.

Still another outstanding fact about our very own forests is that we have such a variety of trees. For example, in all of Europe only 85 varieties are known, outside of Russia. Here, in just one county, in one State, Ohio, around the Miami's Dayton, we have 104 varieties. In all this country we have more than 1,000 varieties of trees. England, always hungry for timber, especially for pulpwood, has only 29 kinds of trees. France has five more, 34. Germany, before the war cut it up, had 60 tree specimens. England has some 200,000 square miles, yet only one type of oak, one type of ash. We have 13 types of oak, 7 kinds of ash in just that one Ohio county, Montgomery.

Of the 1,001 kinds of trees growing in this country, less than 100 are of commercial account. Forty of these are softwoods. About 60 are hardwoods. Some 14 softwoods, 15 hardwoods, are selected as of special value in lumbering, plywood, pulpwood. Softwoods are coniferous, usually evergreens. Hardwoods have the great broad leaves, and are deciduous. Dividing them all up, into their proper classifications, is quite a

Almost Limitless Spruce and Hemlock

job, and really outside the purpose of this pulpwood review. But it is interesting to know, for instance, that the practically new pulpwood forests of the south include some 183 million acres of timber. This is in 194 million board feet of softwood, 144 billion feet of hard. That is nearly one-fifth of all the timber, the commercial timber, we have in this country.

In the 37 States and District of Columbia now operating paper mills, and in the 26 States having pulp mills, there is not enough timber to make the pulp that makes the paper. Newspapers alone, demanding enough newsprint to run off 17 million copies daily take so much pulp that we have to import the balance, mainly from Canada. Canada, too, is running out, or may run out, if our tremendous demand for newsprint continues. Magazines, printing more than 3 billion copies annually, also demand much of both newsprint and calendered grades.

In ten years, southern pine grows sufficiently high (about 30 feet) and broad enough to be cut for pulpwood. Reseeding operations, if carefully and intensively carried out, will reproduce pulpwood crops in plenty, if we are enterprising enough to see that the job is done as the wood is cut. However, of 1,000 acres of forest land cut over each year, every acre should produce an average of 300 board feet, thus producing 300,000 board feet annually, without ruining the forest.

Federal and State Governments are now contributing an average of 25 million dollars annually for forest fire control. Besides, entomologists in regiments are battling the various forest enemies constantly, with all sorts of modern equipment, even with the aeroplane, dusting the woods to free them of bark and ground insects. Bark beetles, Dutch elm disease, and many more difficulties, reduce forestration each day and each year. But the fight is quietly going on, every day. Two bil-

in Great Profusion at Bond Bay, Alaska *(Courtesy, U. S. Forest Service, Photo by E. S. Shipp)*

(Courtesy, U. S. Forest Service.)

This Is Tentative Pulp Timber in Alaska

(Courtesy, U. S. Forest Service.)

Short Man and Tall Trees in Alaska

lion cubic feet of wood are destroyed annually by pests and diseases, sometimes spread by these insects. Some 5,500 watchmen or rangers in lookout towers are always on guard to control fires and other forest enemies. By doing this all the time, and by having chemists and all kinds of forestry technicians forever experimenting with wood, the trees, and all that concerns them, the Government itself is doing its level best to keep what we have, and to regain some of the lost ground in our forest reserves. It is a huge task, never complete, it seems, as the years roll on.

Meantime, 1,180,000 persons are employed in the products of our forests. They are being paid some $2,208,160,000 annually. This includes all kinds of work in wood, from plain logging to the production of pulp and paper.

CHAPTER XVI

Increasing Circulations Demand More and More Newsprint

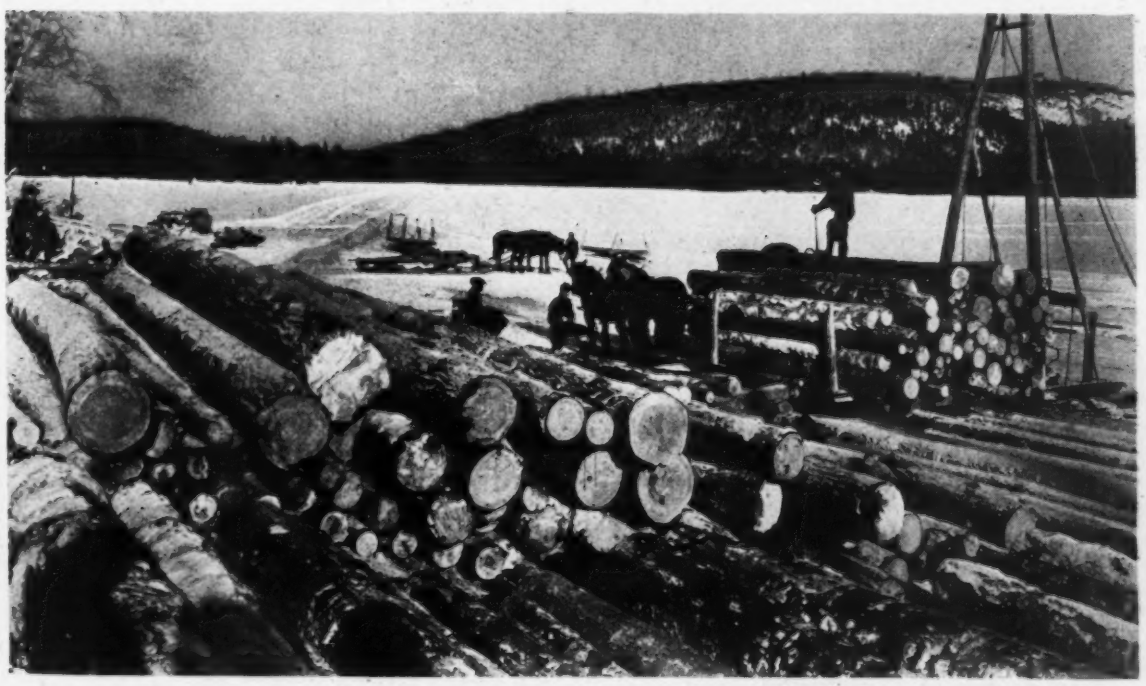
IN 1810, all paper in America was made by hand. In 1848, an up-to-date newsprint machine turned out a ton a day. In 1935, a single machine made 200 tons of newsprint every 24 hours. The weekly Boston News Letter, America's first newspaper, began in 1704 with two pages, 9 x 12 inches in size, and 300 subscribers. The paper was made of hemp and jute. Today, a single issue of a great metropolitan daily uses more newsprint than did all the United States in an entire year, a century and a quarter ago. Today's paper is made of wod.

Five hundred tons of newsprint paper were made in North America in 1810. In 1946, 5,276,953 tons of newsprint was produced in the United States, Canada and Newfoundland. Consumption of newsprint in the United States, which rose from about 1.8 million tons in 1921 to over 4.2 million in 1946, is directly related to the newspaper publishing industry. Number of daily papers, as many as 12,500 semi-weekly and from 1,000, having a combined circulation of about 4 million copies in 1875, to about 2,000, having a circulation of about 50 million copies, in 1946.

During this period the average size of the papers increased considerably. From publications of about 4 pages, measuring 12 by 14 inches, they reached an average of 27 pages, measuring 17 by 24 inches in 1940-41, although they fell to an average of 22 pages in 1945-46. Simultaneously, Sunday editions increased from about the same number of pages as the week-day editions to as many as 90 pages, although they dropped to an average of 70 pages in 1945. In addition to daily papers, as many as 12,500 semi-weekly and weekly papers are being published today.

Raw materials, required for the domestic production of paper and paperboard, are available in large volume from domestic sources. Nevertheless, competing demands of other wood-consuming industries for these materials, especially in areas economically accessible to the mills, have caused the expansion of the industry to be limited to kinds of paper other than newsprint. In fact, production of newsprint has declined greatly. At the same time, the standing of timber, and the

Down to Water—Unloading Pulpwood from Sledge to Stacks for Spring Transport



(Courtesy, International Paper Company)

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Uxtree! Uxtree! Even in 16th Century

A newsboy of the sixteenth century. A hand-colored wood-block print showing a news vender with his pack of tracts and other printed matter offered for sale on the streets of a German town.

great volume of water power available in eastern Canada, have accelerated the growth of the newsprint industry there.

In northeastern United States, and the Lake States, the delivered cost of suitable pulpwood long ago became a potential factor in restricting production of newsprint. But, in the Pacific northwest, wood has continued to be plentiful, and cheap. Several large mills in Washington and Oregon supply the Pacific Coast and inland areas, as far east as the Rocky Mountains. Although the southeastern States have a considerable quantity of standing pine timber for the production of newsprint, they have developed the manufacture of other kinds of paper. Of the two newsprint mills erected since 1931, only one, in western Texas, has been an addition to the industry in the United States, the other having been a replacement.

Growth of the industry in Canada is the direct result of a plentiful supply of raw material, advantageous cost features, the close proximity of the large United States market, and duty-free entry into the United States. Increasing ability of the Canadian mills, to compete with those of the United States, has placed the domestic newspaper publishers in a position of marked dependence upon imported newsprint.

While newsprint has been important in the total import trade of the United States and of the world, it is of even greater consequence in the export trade of Canada. From about 1931 to 1939, exports of newsprint, on the average, accounted for approximately 12 per cent, by value, of total Canadian exports; about four-fifths of such newsprint exports went to United States consumers.

Since the time when wood became the most important raw material for the manufacture of paper, the United States has been the world's largest producer and consumer of paper, of all kinds taken together. Its output has far exceeded, in volume, the output of any other country. For many years its consumption of paper has been greater than production, the deficit imported consisting almost entirely of newsprint.

In 1904, newsprint formed about 30 per cent by weight of total paper and paperboard produced in the United States. But, by 1923, this proportion had dropped to 20 per cent, and, by 1943, less than 5 per cent. Quantity of newsprint consumed in 1943 was nearly four times domestic output, approximately 77 per cent having been imported; the proportion was 82 per cent in 1946.

In no year since 1929 has newsprint paper represented less than 3 per cent of the total value of the import trade of the United States. In 1939, and again in 1946, it represented over 5 per cent of that total. In 1939, this commodity ranked fifth in importance among imports, having been exceeded by crude rubber, coffee, cane sugar, and raw silk. By 1946, it had come to rank second, coffee alone exceeding it in value. In recent years, imports of newsprint have had an annual value several times that of imports of either wood pulp or pulpwood. Hence, newsprint is the principal form in which excess paper requirements of the United States are met by imports.

Consumption of newsprint in the United States, which appeared to be leveling off at between 3.5 million and 4 million tons a year immediately before World War II, is influenced by several factors, among which are (1) general business activity, as reflected in news and advertising, (2) increase in and concentration of population, (3) growth of news-picture periodicals, and (4) competition by radio.

The industrial northeastern and Lake States, in which both production of newsprint and population are concentrated, have the largest total and per capita consumption of newsprint. These two areas produce only about one-eighth of the newsprint they consume. The south, having a much lower concentration of population, consumes only about 10 per cent of the national total. Even so, it produces only about 15 per cent of its requirements. Pacific northwest, supplying many coastal towns and cities to the south, makes almost enough newsprint for its own requirements, but still imports a small quantity.

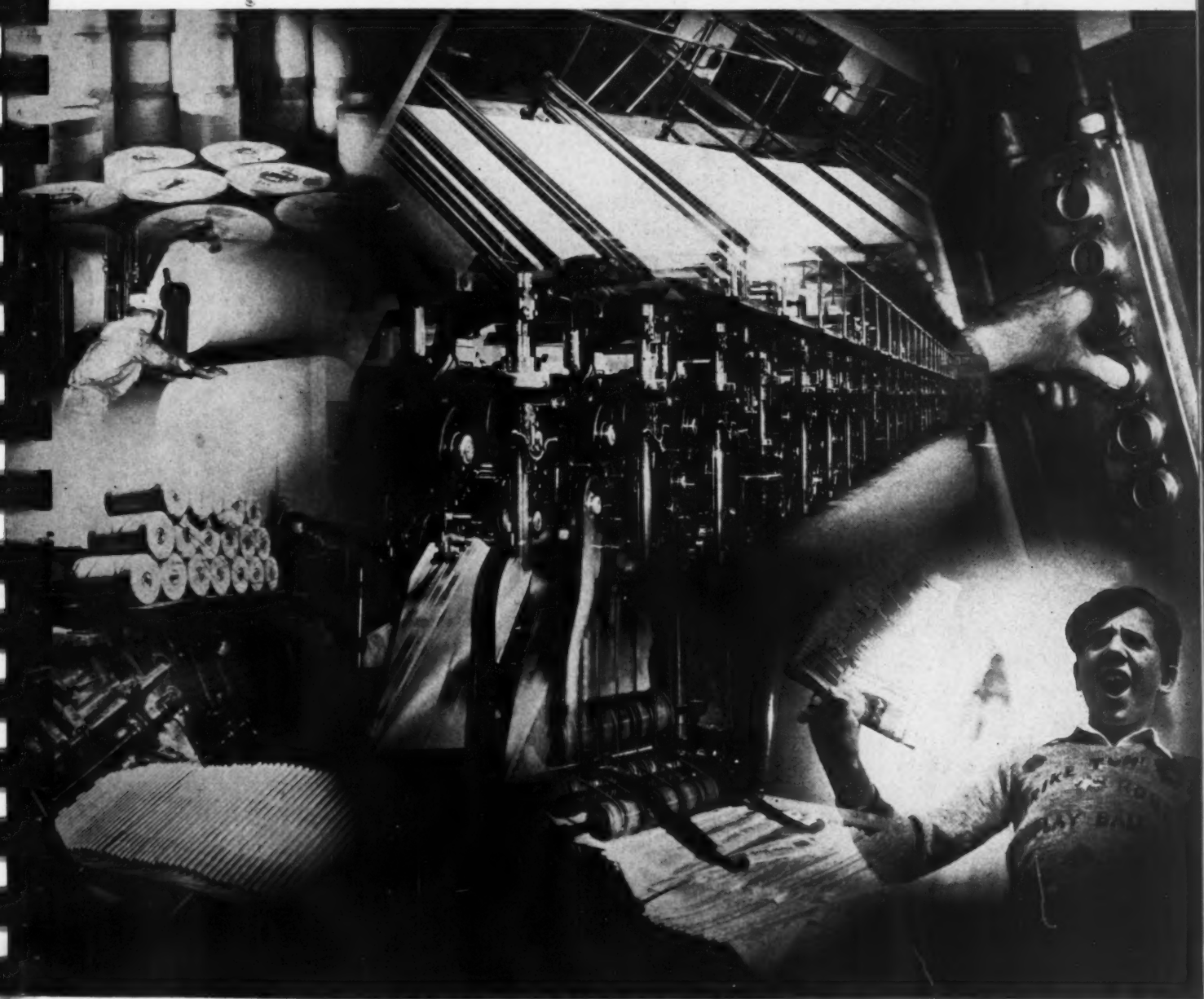
During the early part of the century the United States imported only a small part of its newsprint

requirements, although a relatively large volume of pulp and pulpwood was obtained from foreign sources. By 1925, domestic and imported newsprint formed nearly equal parts of the total United States consumption. After that year, imports steadily increased, and domestic output gradually fell. At the same time, however, total consumption mounted, until, during World War II, imports were over three times domestic production. And, after the close of the war, they mounted to over four times the production.

Major factors influencing imports of newsprint have been (1) the upward trend of consumption until recent years, and (2) the reduction in the economically available domestic stands of pulp timber of suitable kinds, because of competing demands for wood by other industries. Freedom from duty has also stimulated importation of newsprint to a greater extent than it has raw materials for making it, because of its lesser bulk, and consequent lower transportation charges; and of the fact that newsprint can be produced most economically in large volume, by continuous process in the same plant which makes the pulp. As a matter of fact, very little newsprint is made in the United States from imported pulp. Most of the

Extra! Extra! Five Star Final

In this melange of newsprint to newsboy the full story is told of the daily paper



(Courtesy, International Paper Company)

(Courtesy, International Paper Company)

Down the Sluiceway Come the Long Logs to be Cut and Ground into Today's Pulpwood for Tomorrow's Paper

normally large imports of pulp are used for other kinds of paper.

As a source of newsprint imports, Canada has the advantage of an ample supply of pulp timber and of numerous large and efficient integrated mills, located so as to permit the shipment of newsprint to important United States markets at minimum transportation charges. Dominion and Provincial Governments have placed some restrictions on the exportation of pulpwood from Canada, but none on the exportation of either pulp or newsprint. As a result, the exports of newsprint paper from Canada, since about 1930, have represented from 10 to 15 per cent of that country's total exports in value. Bulk of this exported paper, 80 per cent or more, has been shipped to the United States.

Most of the imported Canadian paper has been consumed in the northeastern and Lake States, where it has supplemented a dwindling domestic supply, made at a relatively high average unit cost. Trend of total capacity of the newsprint mills in these States has long been downward, several having shifted to the production of other papers, and others having closed down.

Mills in Oregon and Washington have supplied the greater part of the newsprint consumed in the area west of the Rocky Mountains. The rest has come mainly from mills in British Columbia, with Finland, Norway and Sweden supplying variable quantities.

In 1940, the complete dependence of the south on Canada and Europe for newsprint was broken by the opening of a mill in western Texas, having an annual capacity of about 50,000 tons. Substituting partly bleached sulphate for unbleached sulphite pulp, as one of the constituents of newsprint, it demonstrated that the southern market could be supplied, in part, with satisfactory newsprint from local sources and raw materials. It has not, however, been clearly shown that the delivered cost to publishers will permit newsprint, made in the south, to compete with that of Canada, in the larger consuming centers along the South Atlantic and Gulf coasts, to say nothing of areas farther north.

Before the war, exports of newsprint from the United States were small, principally to the Far East and Latin America. During World War II they more than tripled their customary volume, and also increased in unit value. But they did not exceed 5 per cent of production, except in 1941, when they were almost 7 per cent of domestic output.

Official figures indicate that, since 1940, average costs of producing newsprint have been the highest in the Lake States, followed by the south, the northeast, and the Pacific northwest, in that order. Costs in Ontario and Quebec are stated to be somewhat lower than in the northeastern and Lake States.

Rising domestic costs of producing newsprint, the rapidly growing demand for other kinds of paper, and a diminishing supply of suitable pulpwood economically available, all are adverse to any future recovery of the newsprint industry in the United States. In the northeastern States, effective competition with more modern and more efficient Canadian mills, located nearer supplies of pulpwood, and operating at somewhat less cost (and, during the period 1940-46, having an advantage in exchange) is possible for only one or two of the most efficient United States mills. These particular mills probably will remain in production indefinitely. But others, classed as marginal or high cost plants, will probably abandon, in time, the production of newsprint entirely.

In the Lake States, production of newsprint temporarily ceased in 1946, but will be resumed in two mills in 1947. In the Pacific northwest, where the cost of production is lower than elsewhere in this country, the newsprint mills, now operating, may continue to produce for a long time. However, little of their product is likely to enter markets east of the Rocky Mountains

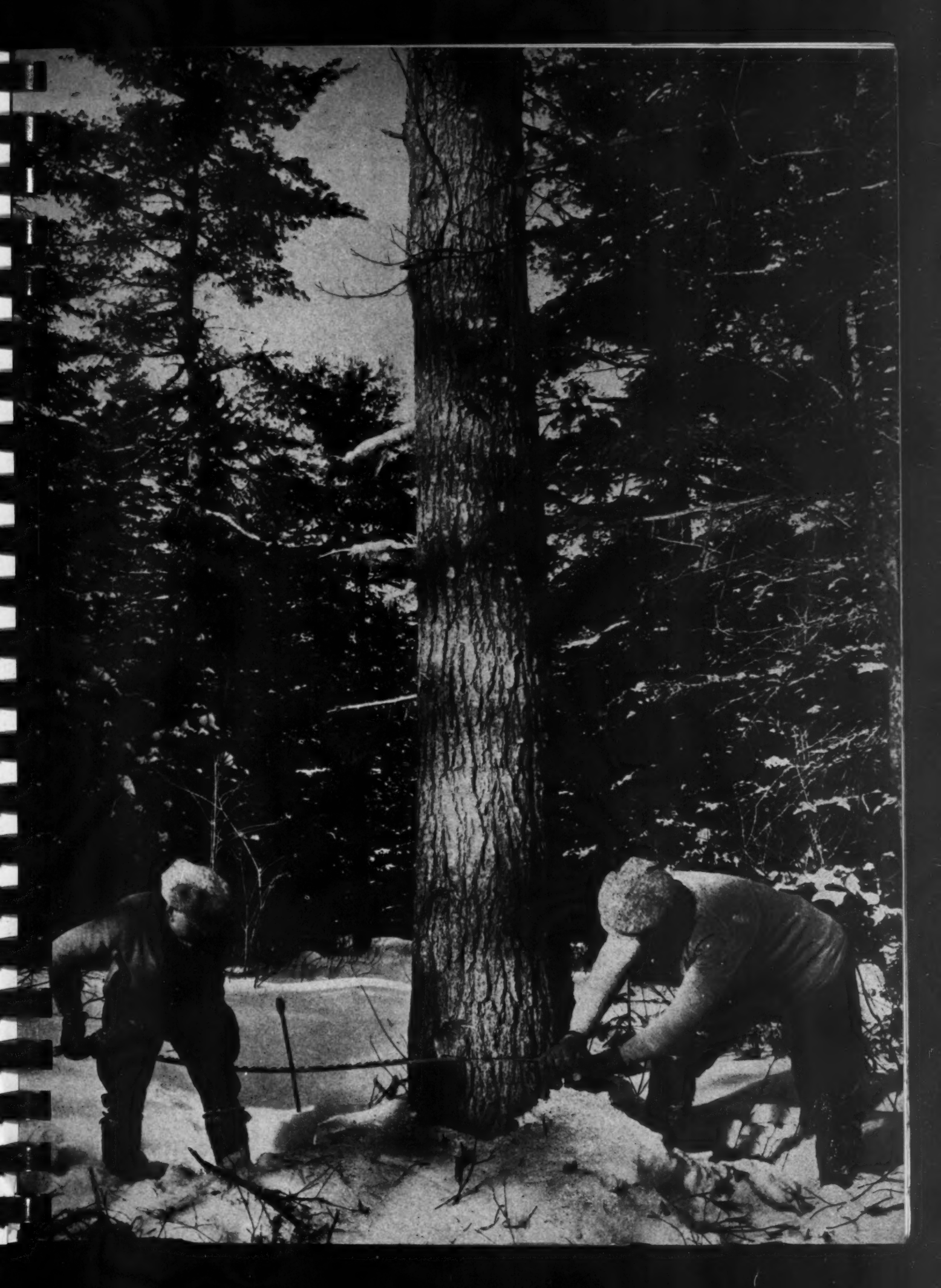
---

(Picture, Opposite Page—)

(Courtesy, International Paper Company)

Cutting Down Another Pulpwood

Winter is the best time to cut the timber. Pulpwood logs are more easily handled in the days when the snow is on the ground.



(Courtesy, International Paper Company)

And So Along the Conveyor Go the Pulpwood Chips to the Digester

Future of the industry in the south is highly conjectural largely because of (1) the rapidly expanding competition among all wood-consuming industries for stands of suitable timber economically located, and reasonable in price, (2) the rising cost of labor, (3) the consequent increasing delivered cost of pulpwood, and (4) the ability of Canadian newsprint to compete with southern newsprint in principal southern centers of consumption, most of which have the advantage of water transportation.

Two or three additional mills, of moderate capacity, may be erected in the south, but probably only with the financial assistance of newspaper publishers in the region, and who are in a position to use the entire output of these mills for an indefinite period. Limit of expansion of the industry in the south, hence, will probably be determined by the region's consumption in the areas inland from the coastal cities, perhaps not more than 150,000 to 200,000 tons a year.

Continued reduction in the domestic output of newsprint is partly due to the fact that other papers, nearly all on the dutiable list, offer greater advantage to the mills. Since the beginning of World War II, this situation has made more problematical the retention of a newsprint industry in the northeastern United States.

Throughout 1946, the demand for newsprint in the United States continued to increase at a more rapid rate than the output of the continent, as a whole. And, by the end of that year, domestic requirements had exceeded those of 1939 by about 700,000 tons, or about 20 per cent, so that inventories were materially reduced. Consumption for the year was approximately 4.25 million tons, and probably an additional 100,000 tons could have been consumed, had the quantity been available. On this basis, not less than 4.4 million tons will be required by the United States in 1947.

Total annual capacity of United States newsprint mills, in the first quarter of 1947, is estimated to be about 850,000 tons, or about 10 per cent greater than the actual output in 1946. Number of mills in operation, during the year, will probably be 13, of which 5 will be in the northeast, 2 in the Lake States, 5 in the Pacific northwest, and 1 in the south. Total capacity of the Canadian mills, as estimated by the Newsprint Association of Canada, will be very nearly 4,350,000 tons. The 19 companies operating in Canada have a total of 34 mills, of which 19 are in Quebec, 10 in Ontario, 2 in British Columbia, and 1, each, in New Brunswick, Nova Scotia and Manitoba.

Two companies, each operating one mill, are producing newsprint in Newfoundland, their total capacity for 1947 being estimated at 390,000 tons.

Full utilization of the capacity of the Canadian and Newfoundland mills in 1947, if accomplished, will probably tend to increase the total quantity of newsprint for world distribution. But how much of this will be available to United States publishers depends, largely, on existing contracts, commitments within the British Empire, and the presence or absence of transportation and labor difficulties.

Future relationship of Canada and the United States, as principal supplier and principal consumer, respectively, depends, to a considerable extent, on the long-time policy of the Dominion and Provincial Governments on cutting and use of their timber. There is now evident some concern, on their part, over depletion of the more readily available stands. Fire, insects, and disease are estimated to be causing, annually, about one-fourth of the total drain on Canadian forests. And the drain, for purposes other than paper making, is increasing at a rapid rate.

At the same time, newspaper circulation in the United States has increased by about 20 per cent since 1939, and all indications are for continued growth. Furthermore, it is expected that some time will elapse before the demand for newspaper advertising space will fall to normal. And, until it does so, newsprint requirements will continue to grow. Under these circumstances, the possibility of the Canadian mills being able to supply these requirements may be open to question.

(Picture, Opposite Page—)

Winding River to Transport Pulpwood to the Churning Flume, Thence to the Mill

(Courtesy, U. S. Forest Service.)

Surveyor Tests Trees for Newsprint in Alaska

Present indications are that one or more of the Provinces will endeavor to prevent the exportation of wood from Crown lands to any other Province, or any other country, unless it is first fully converted into a finished product, or unless a license to export is obtained. While this provision would affect only a minor proportion of the United States imports of paper, and paper-making raw material from Canada, it would tend further to stimulate the expansion of the newsprint industry there.

Consumption of newsprint in the United States in 1946 was about 4.25 million tons, approximately 17 per cent more than in 1939. World output probably did not exceed 7 million tons, which was about 10 per cent less than in 1939. Decrease in production was chiefly in European countries. United States consumption in 1946 represented, and probably in 1947 will represent, not less than 60 per cent of the world supply. Although European production is recovering from the effects of the war, it is likely to continue, for some years, to be materially smaller than before the war.

Impoverished condition of the continental European countries has reduced the demand for newsprint below prewar levels. But they may find difficulty in obtaining these reduced requirements. It seems doubtful, therefore, whether any considerable quantity of European newsprint will be imported into the United States in the next few years.

Large volume of timber in southern Alaska makes that territory a potential supplier of newsprint. Climatic conditions, in the narrow belt of coastal islands, along the western side of British Columbia, favor a rapid and heavy growth of timber, and the pulpwood available, within a few miles of tidewater, is estimated at 150 million cords, sufficient to produce 1 million tons of newsprint annually. Much of this wood could be delivered to such mills, as might be established within the area, for not more than $6 to $9 a cord.

Bids have been invited by the United States Forest Service on specified areas in the Tongass National Forest, but no construction has as yet begun. Since any newsprint mills in the territory would probably be located at or near deep water transportation, their product would be able to compete with Canadian newsprint, in both west and east coast markets of the United States. However, certain rights, granted the Indian tribes in this region, must be given full consideration. And, until all questions concerning these and other matters are settled, it is unlikely that mills can be constructed and put into operation.

Production of newsprint paper in Alaska could hardly begin, in any event, in less than two years after completion of arrangements. Not only would be mills have to be erected and equipped, following the necessary financial arrangements, but power sites would have to be developed, the necessary preliminary work in woods completed, and logging equipment provided. To erect and equip a newsprint mill, and provide sufficient power and water, together with facilities for its permanent personnel, would cost, at this time, according to industry estimates, between $55,000 and $60,000 per day ton of capacity, or, for a 250 ton mill, about 14 or 15 million dollars, exclusive of timber rights.

Hence, to produce 1 million tons of newsprint annually in Alaska would require an initial investment of well over 100 million dollars. What part of this amount, at this time, would represent a sound investment will doubtless be fully investigated before such steps are taken. Development of Alaskan timber resources, however, may not be confined to production of newsprint, but may include the manufacture of pulp for other kinds of paper, as well as for rayon and other products of chemical conversion. Some may also be used for lumber.

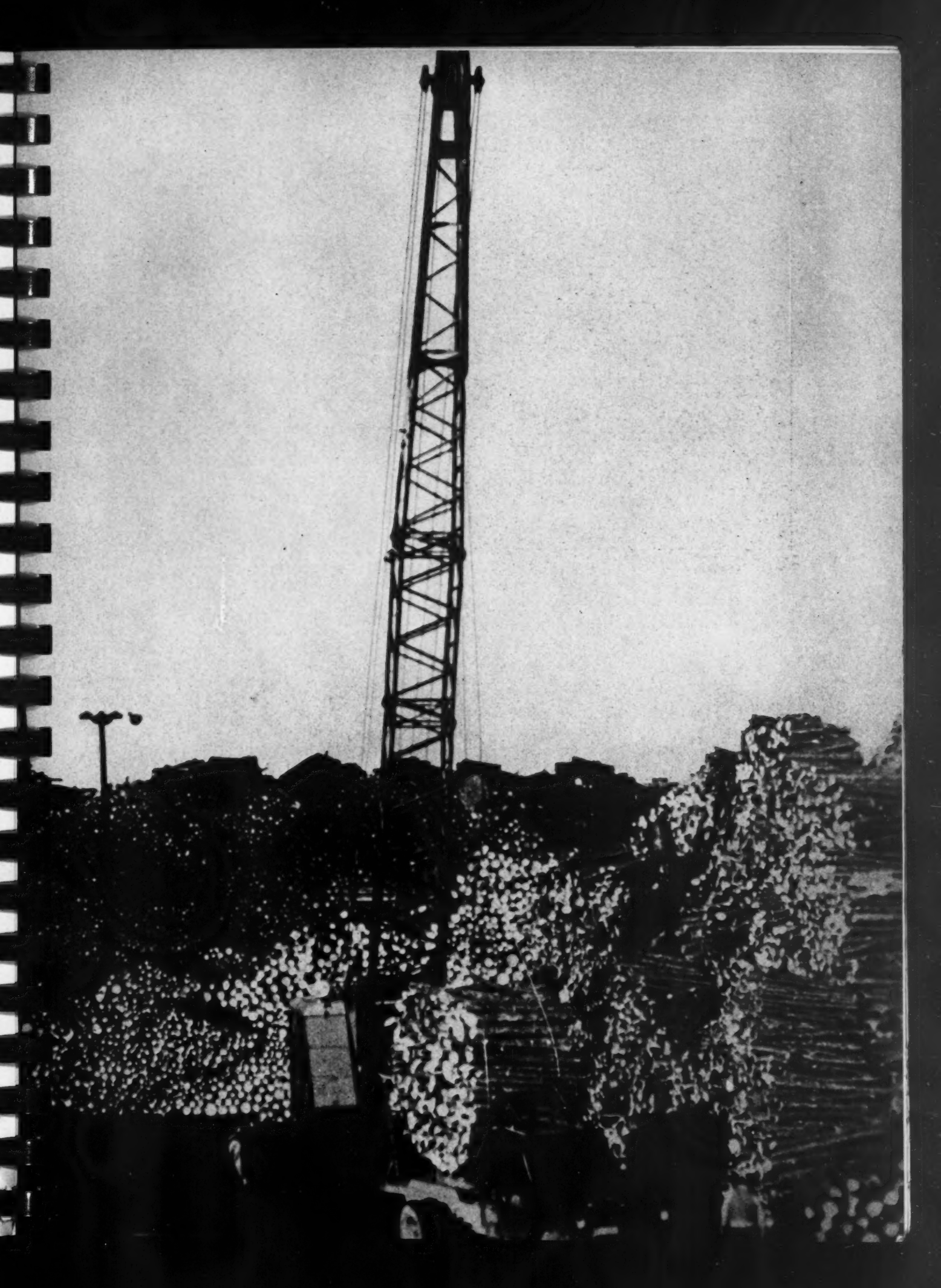
Standard newsprint paper is one, and much the most important, of a group of printing papers made with varying proportions of groundwood and unbleached chemical wood pulp, all others of the group being dutiable, under the provisions of paragraph 1401 of the tariff act of 1930, as uncoated book or printing paper. No precise trade definition of standard news-

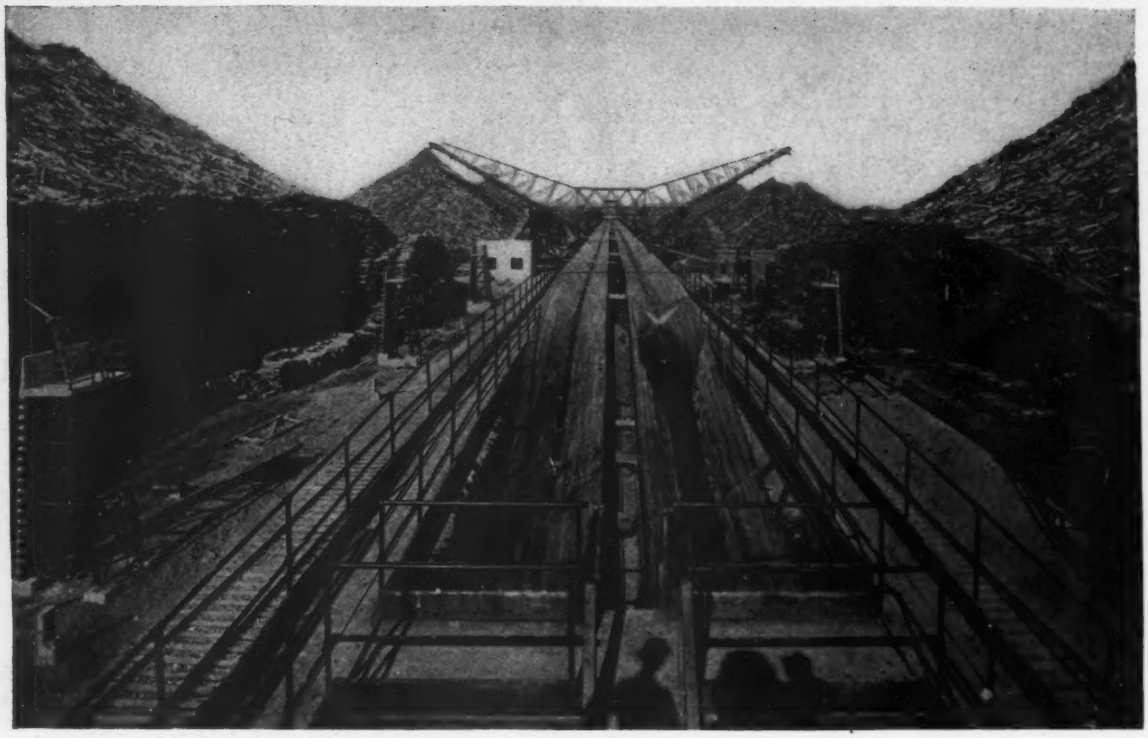
---

(Picture, Opposite Page—)

(Courtesy, International Paper Company)

Swinging Pulpwood from Truck to Yard Reserve at an Oversold Mill





(Courtesy, International Paper Company)

Coming Down the Flume—Conveying Pulpwood from Reserve Piles to Mill

print has been formulated. The Treasury Department, however, has prescribed certain specifications with which newsprint paper must comply in order to enter free of duty as standard newsprint paper. These specifications fix a minimum weight of 30 pounds, and a maximum of 35 pounds for 500 sheets of 24 by 36 inches. Rolls must be not less than 16 inches wide and 28 inches in diameter. Not less than 70 per cent of the total fiber content must be groundwood; the remainder must be unbleached sulphite. The time of water transudation, that is, the time it takes water to pass through the paper, must be not more than 10 seconds, by the ground-glass method, or 5 seconds by the valley-size tester, or curl method. Ash content is limited to not more than 6½ per cent, and gloss to not more than 50 per cent. Thickness is to be not more than 4/1000 of an inch, with a tolerance of 5 per cent.

In order to print well under all pressroom conditions, newsprint should have ample strength, good surface smoothness, brightness, absortive capacity, optimum moisture, and freedom from mechanical imperfections. All newsprint is not exactly the same in each of these qualities, because manufacturers are aware that wide variations exist in local atmospheric and pressroom conditions, and they make the paper to suit, as nearly possible, the needs of particular consumers.

Much of the value of newsprint lies in its ability to absorb ink quickly without offsetting, and in being sufficiently opaque to prevent "show-through." Particular combination of materials used, together with the finish given the paper in its manufacture, are designed to accomplish these results.

Newsprint differs from nearly all other paper used for printing, largely because it is used to print material that is seldom long preserved. Hence, although it should have qualities that permit reasonably attractive printing and easy reading, deterioration of the paper, with age, is not of major importance.

Identically the same materials, as those used for newsprint, are also used in making other grades of groundwood printing papers, as well as hanging stock for wallpaper, but they are used in somewhat different proportions. The so-called "pulp" magazines employ a paper containing various proportions of chemical pulp, filler, and size, which may, if combined with greater or less thickness and weight than specified for newsprint, cause it to become a different product. Hanging stock likewise contains more chemical pulp, and much of it a higher grade of ground wood, than newsprint does. These differences are so minor as to permit these papers, though specialized products, to be made with a minimum of adjustment in newsprint mills. They illustrate the shifts in grade which have occurred when United States mills have abandoned the production of newsprint.

The economic impracticability of making newsprint in any quantity, from materials other than wood, limits

its large-scale production to mills in countries having a considerable supply of suitable wood readily accessible. Canadian forests represent such a supply; so do the forests in some parts of the United States, and those of northern Europe. In 1939-40, the annual drain on the world forest resources for the manufacture of newsprint, exclusive of all other types of paper and board, approximated 9 million cords, of which 4.7 million cords were furnished by the timberlands of the United States, Canada and Newfoundland.

In 1945, the volume of pulpwood consumed, in making the world supply of newsprint, was about 7.5 million cords, of which Canadian forests supplied about 4.4 million cords, and United States forests 900,000 cords. The country having the greatest potential supply of pulpwood is the Soviet Union. Little of the Soviet supply is now being utilized, but, under a program of expanding industrialization, it will unquestionably be used much more extensvely in paper making.

Any statement concerning world production of newsprint should emphasize the lack of uniformity in the product, so classed, in the various countries making it. Paper sold and used as newsprint, in a number of foreign countries, while it may not be identical in either finish or physical quality with that so designated in the Unted States, is, however, the kind and grade of paper customarily used for the printing of newspapers in the countries producing it, or to which it is exported, and such differences as occur are not very significant.

Canada is much the largest producer of newsprint. The Canadian paper industry in its entirety, exclusive of timberlands, represents an investment of nearly 700 million dollars; probably half of this amount is United States capital. According to figures published by the Dominion Bureau of Statistics, the total output of paper in Canada in 1945 was almost 4.4 million tons, valued at 282.2 million dollars; newsprint represented about 77 per cent of the total quantity and 67 per cent of the total value. Aggregate volume of pulpwood, consumed by the Canadian mills during the year, was 7.5 million

Debarked Pulpwood for the Chippers

(Courtesy, International Paper Company)

(Courtesy, International Paper Company)

Cleaning the Debarked Pulpwood Before Chipping

cords, of which approximately 3.5 million, or 47 per cent, were used for newsprint. About 32,000 persons are employed in the newsprint branch, out of a total of 40,000 for the entire industry.

Next to Canada, as the most important newsprint producing country, the United States, the United Kingdom, Finland, Japan and Germany ranked in about that order before World War II. In 1939, these six countries produced almost 80 per cent of the world output, Newfoundland making an additional 4 per cent. Among the importing countries the United States, even though a major producer, has been the most important, followed by Great Britain, Argentina, Australia, Denmark, China, Brazil, and some of the smaller Latin American countries. Little newsprint is imported into the United States from countries other than Canada and Newfoundland.

Before the war, the United States and the United Kingdom were the two leading newsprint-consuming countries, followed by Japan, France, Germany, Canada, the Soviet Union, Argentina, and Australia. Of these, Japan, France, and the Soviet Union were very nearly self-sufficient, and exported or imported only negligible quantities, or none at all. Argentina and Australia imported nearly all they consume, although the latter country is now producing some newsprint. Great Britain imported, normally, over 30 per cent of its prewar requirements. Japan consumed 90 percent or more of its output, exporting some to China and other nearby Asiatic markets. Germany consumed about 75 per cent of its normal output, and exported the rest to widely distributed markets in Europe, the Far East, and Latin America. Countries making newsprint manufactured all, or nearly all, of their pulp requirements, but several, such as the United Kingdom, France, and Germany, imported considerable quantities of pulpwood.

Standard of living, literacy, and complexities of printed language all influence per capita consumption of newsprint. So do, also, concentration of population and general cultural advancement. Trend in world newsprint consumption has been upward since about 1870, when wood assumed a position of genuine importance as a paper-making raw material, largely because of its lower cost and abundance. Use of wood was promptly followed by a rapidly expanding circulation, and an increased average number of pages in all classes of newspapers.

Increasing population, in most countries, combined with a better news coverage in those where literacy was high, and the press unrestricted, caused the consumption of newsprint to mount. Growth of consumption was, however, not uniform in all countries. In some, wood or other econmical sources of fiber were not available. In others, illiteracy was high, and cultural progress retarded. In many, standards of living were not sufficiently high to permit large support of newspapers by circulation and volume of advertising. The United States, having a minimum of adverse factors, became, in less than 50 years, the world's largest total and per capita consumer of newsprint.

In 1925-26, production and imports of newsprint were nearly equal in volume, and exports represented only 1 or 2 per cent of production. By 1937, production had decreased by about 40 per cent, and imports had about doubled, making the ratio 1 to 3, a relationship roughly maintained until 1943, when the ratio of imports became materially higher. Meanwhile, exports, less than 1 per cent of production in 1927, fluctuated, during the following years, between 1 and 7 per cent. Largest volume was exported in 1941, when over 70,000 tons was sent out of the country, from a total of a little over 1 million tons manufactured. In 1946, imports were 4.5 times the quantity produced, and exports had fallen to approximately 32,000 tons, or about 4 per cent of the domestic output.

Before the war, United States consumption of newsprint ranged between a low of 2.7 million tons (1933)

(Courtesy, International Paper Company)

Zizz, Zizz, Zip Go the Circular Saws as They Cut Pulpwood Logs into Sizes Convenient for Mill Handling

and a high of nearly 4 million tons (1937). In 1946, it was about 4.2 million tons.

Year end inventories have varied considerably, ranging from a low of about 181,000 tons in 1925 to a high of nearly 629,000 tons in 1937. Since then they decreased, falling to less than 300,000 tons at the end of 1945, their lowest point since 1933. These stocks appear to depend, somewhat, on the maintenance of a high operating ratio in the domestic mills.

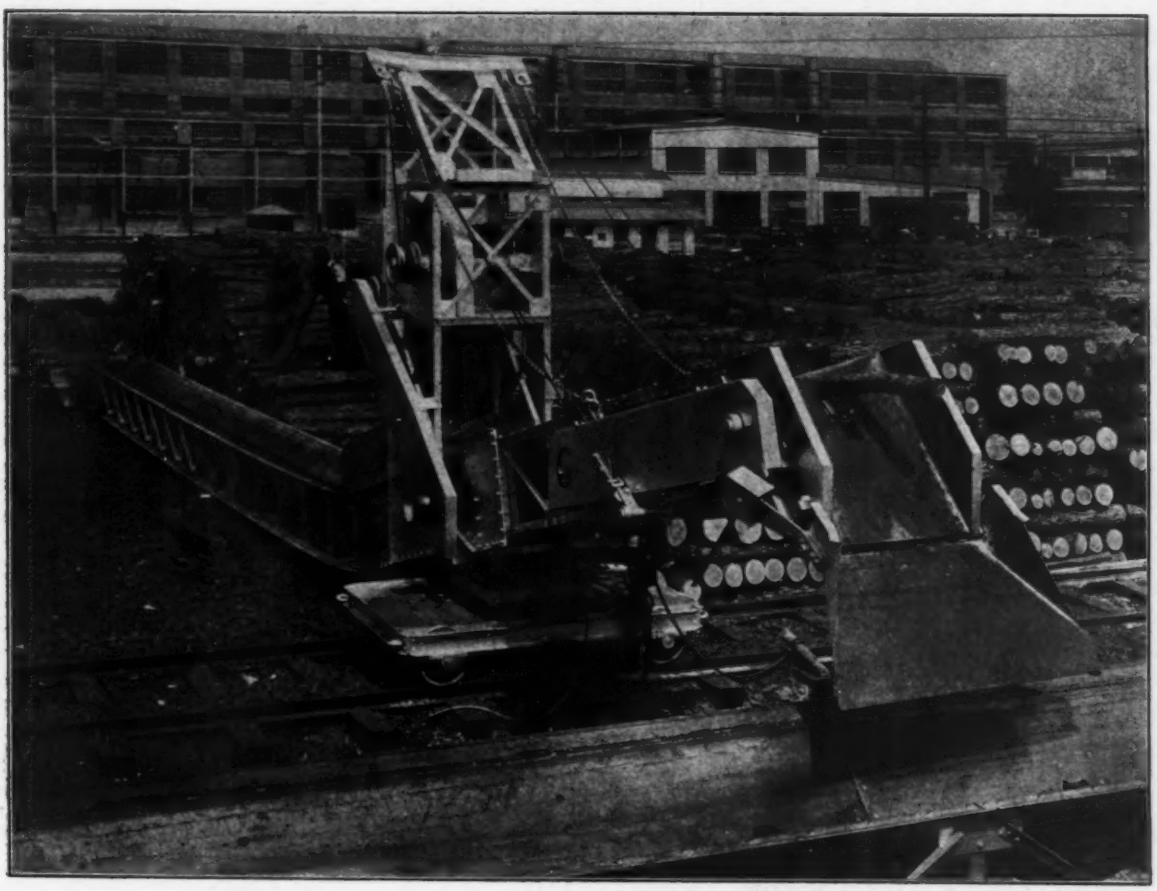
Production of standard newsprint in the United States reached its peak of nearly 1.7 million tons in 1926, and, by 1944, had declined to about 42 per cent of that quantity, but recovered somewhat in 1946. During this period the number of mills making newsprint had fallen from nearly 60 to 11 or 12, of which only 3 make newsprint exclusively, the others dividing their capacity with wrapping, writing and printing papers.

After 1914, the growth of the newsprint industry in the United States was greatly retarded. During the period 1915-26, however, the trend of production was upward, but without any substantial increase in capacity. With the growth of the paper industry, as a whole, after 1913, some of the older newsprint mills shifted part of their combined capacity to other grades of paper, a few mills, with newer and more efficient newsprint equipment, taking their place. Development of the industry in the Pacific northwest began during this period. Meanwhile, the output of newsprint in the eastern Provinces of Canada was rapidly expanding.

Newsprint is produced in all the major paper-making regions of the United States. During part of 1946, production in the Lake States was suspended, but resumed again in 1947. The industry was first established in the northeast and the Lake States, and somewhat later in the Pacific northwest and south, in the order given.

In the northeast, Maine and New York have been the principal producing States, both having, within easy reach, an ample supply of raw material when wood was first used for paper-making, and, also, being within a short distance of important markets. In 1909, Maine produced 312,000 tons of newsprint. In 1925, this had increased to 470,000 tons, and, by 1941, to 510,000 tons. New York, where the industry was established earlier than in Maine, produced 375,000 tons in 1909, and 483,000 tons in 1925, but by 1941, its output had declined to 122,000 tons. A few other northeastern States, including Vermont, Massachusetts, and New Hampshire, reported various quantities in the early part of the century, but had almost ceased producing

Portable Yard Conveyor, with Hinged Boom to Permit Passage of Railroad Cars on Log Yard Spur



(Courtesy, Champion Paper & Fibre Company, Houston Division, Pasadena, Texas)

(Courtesy, International Paper Company)

Logs, Logs, Logs—A River Full of Pulpwood Logs Moving into a Mill

newsprint by 1941, principally because the mills were small, and because the increasing distances, from which the necessary pulpwood had to be transported, made the continued production of newsprint, as compared with that of other papers, uneconomical.

In the Lakes States, Wisconsin made about 25,000 tons in 1890, and, by 1909, had increased this to nearly 170,000 tons. By 1929, the quantity made had declined to 103,000 tons, and, by 1941, to less than 18,000 tons. Minnesota produced 39,000 tons in 1909, and, from 1925 to 1929, made about 122,000 tons a year; by 1941, the total had decreased to 31,000 tons. Production in the Lake States ceased during part of 1946, but resumed in 1947. This region, like the northeast, originally had a considerable volume of both saw and pulp timber, which has since been cut, to a great extent.

The later development of Oregon and Washington, as a newsprint producing area, was due, largely, to technological progress in the utilization of western hemlock. In 1900, Oregon mills made about 21,000 tons of newsprint; by 1941, they produced 136,000 tons. Washington, entering the field somewhat later, made 96,000 tons in 1925, and 140,000 tons in 1929. This had increased to about 150,000 tons in 1941.

Manufacture of newsprint began in the south in 1940. The industry there is represented by only one mill at Lufkin, Texas, which makes approximately 50,000 tons a year. This development began with the discovery that pine, under certain conditions, could be used for groundwood, and that semibleached sulphate pulp could easilly be substituted for unbleached sulphite in making newsprint. While paper so made does not conform exactly to the Treasury Department's specifications for standard newsprint, and could not be imported as such, it is, nevertheless, suitable for use in printing newspapers and other matter, for which standard newsprint is customarily employed. The mill at Lufkin is a considerable distance west of the large centers of consumption on the South Atlantic and Gulf coasts, but is within reach of a plentiful supply of raw material, and of towns, in Texas and the lower Mississippi Valley, requiring a substantial quantity of this paper. Plans for doubling the capacity of this mill were started this year, and, in addition, a newsprint mill is projected for Alabama.

Interregional shipments of newsprint in the United States are of little consequence in relation to the total volume consumed. None of the regions indicated, except the Pacific northwest, have sufficient output to make substantial shipments to consumers in any other region.

Factors affecting total costs—the elements entering into cost in the manufacturing of newsprint, are the same in all regions, because all the mills making this paper are integrated, and purchase practically none of the pulp they used. Although the cost of producing newsprint varies considerable between regions, average costs for the country, as a whole, where these are obtainable, can be used for general comparison.

The most important direct items of cost are those of wood pulp and labor. According to the cost records of OPA, covering 7 concerns in mid-1946, the cost of the pulp consumed in making newsprint ranges from 60 to 76 per cent of the total, direct labor accounting for between 6.0 and 16.5 per cent, in addition. Power and fuel represent 3.5 to 8.5 per cent. Interest on investment in plant, equipment, standing pulp timber, and working capital is also a substantial part of the cost of producing newsprint. Items of lesser importance include depreciation, depletion of standing timber, repairs, supplies, taxes, and insurance.

No figures covering cost of production are obtainable until 1933. In that year the Newsprint Manufacturers Association of the United States certified to the National Recovery Administration that the average cost of producing a ton of newsprint, for 24 United States concerns, was about $36 during the third quarter of that year, when these companies were operating at an average of 76 per cent of capacity. These costs include depreciation and depletion totaling $3.74 per ton, but, apparently, do not include interest.

Beginning in 1940, cost records have been obtained by OPA as a basis for the establishment of a maximum price for newsprint. These show that average cost in the United States had declined to about $31 a ton in 1940, but had risen to approximately $32 in 1941.

(Courtesy, Spaulding Pulp & Paper Co., Newberg, Oregon)

From Flat Cars to Log Pile

(Courtesy, The Brown Company, Berlin, New Hampshire)

Snow Bound, Yet Logs Move in by Sledge and Out by Train

By 1944, however, the effect of the war was to increase the average cost to over $43 a ton, and, in the first quarter of 1945, to more than $45 a ton. By the middle of 1946, the average was $47.90 a ton. The figures given represent cost at mill, omitting interest and depreciation for purposes of comparability.

Pacific northwest has had, since 1940, lower average costs of producing newsprint than any other region in the United States. Lake States have probably had the highest. The south and the northeastern States appear not to have been very far apart in average costs.

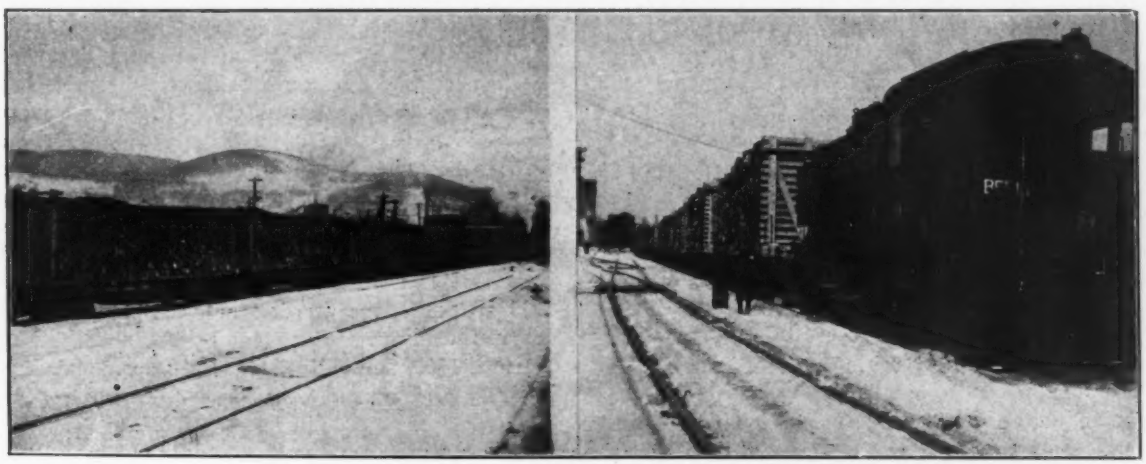
Cost of producing newsprint, in countries other than the United States, can be indicated only for certain years. Not all of these are in the same years as those for which United States costs have been given.

Figures published by the Association of Newsprint Manufacturers of the United States, in January, 1934, show that the average cost, for 24 producing companies in the United States, during the first half of 1933, was $43.28 a ton, the companies operating at 70.8 per cent of capacity. Data from the same source show that, during the same period, 12 Canadian companies averaged $43.53 a ton, while operating at 55.4 per cent of capacity. Difference of about 15 per cent in operating ratio would represent from $1.50 to $2.50 a ton difference in cost. In 1940, costs of production in Canada averaged $36.25 a ton, compared with an estimate of approximately $39 a ton for the United States. Cost of producing newsprint in Newfoundland is approximately the same as Canada.

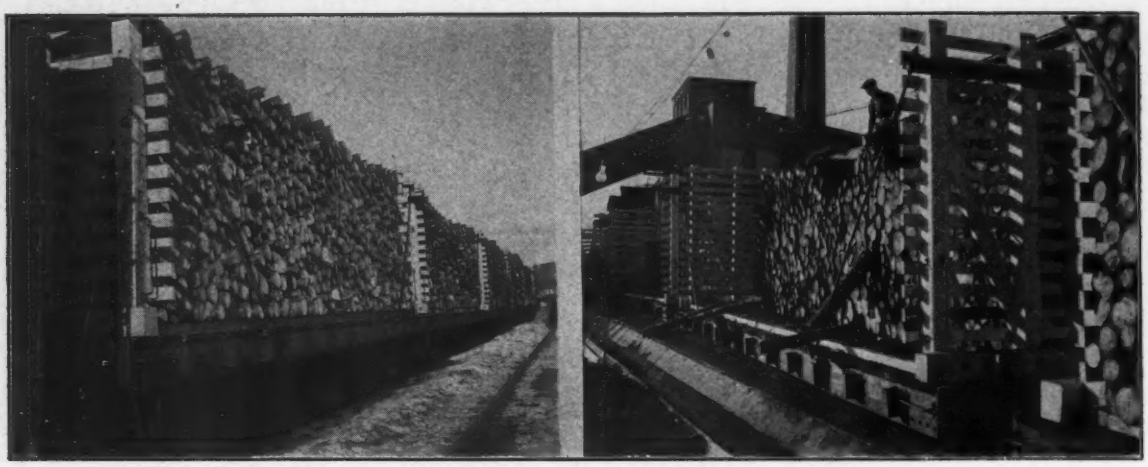
No recent data are available on the costs of producing newsprint in Germany, Finland, or the Scandinavian countries. Data from trade sources, generally substantiated by reference in United States foreign trade reports, indicate, however, that, several years before the outbreak of World War II, European costs ranged from 20 to 60 per cent below the average for the eastern part of the United States, Finland ranking lowest. For no country is there any published material concerning costs during World War II.

During the last few years, newsprint, delivered to the publishers, has been paid for at the price specified

Trainloads of Pulpwood for the Brown Company, Berlin, New Hampshire



(Courtesy, The Brown Company, Berlin, New Hampshire)



(Courtesy, The Brown Company, Berlin, New Hampshire)

More Pulpwood by Trainloads for the Brown Company

by OPA. This control ceased November 10, 1946. The price, as set forth in maximum regulation 130 and its amendments, was the one which was to appear on the invoice sent to the publisher or consumer, and was described as "f.o.b. mill, with carload freight allowed." The mill was not permitted to increase its invoice price per ton for shipments in less than carload lots. It appears to have been customary for the consignor to pay for the actual cost of transportation, and for the consignee to pay the full amount of the invoice as rendered. For this reason the net return to the mill varied with the distance which the shipment traveled from origin to destination.

Since the zone system, established during the time of the NRA, was accepted by the OPA, and used as the basis for the establishment of maximum newsprint prices, the manner of procedure indicated gave the mills in eastern Canada an advantage in the markets of the northeastern United States. It appears to have contributed to the decline of the domestic industry in the northeastern and Lake States, as pulpwood stands were depleted, and costs became higher.

Approximately 95 per cent of the newsprint consumed in the United States is sold in rolls, on contract, by the producer, direct to the consuming publisher. The remainder, in sheets, is sold largely to wholesalers and jobbers, who supply commercial printers or local country newspapers. Contracts, covering sales of roll newsprint, usually cover periods of from one to fiev years or more, and are customarily subject to adjustment of terms and prices during their existence. These contractual relations make competition, particularly from European producers, somewhat difficult.

According to a survey made by the American Newspaper Publishers Association, approximately 60 per cent, of the total newsprint consumed in the United States in 1940, moved entirely by rail from mill to consumer; about 34 per cent by water; 2 per cent by truck; and 4 per cent by a combination of two or more of these methods.

Between 80 and 90 per cent of the newsprint, produced in the northeastern and Lake States, moves by rail, and about half of that made in the Pacific Northwest is transported by water. In the northeastern and Lake States the larger cities and towns, comprising the greater part of the market, are scattered well inland; on the west coast the markets are on or near seaboard, and, hence, are easily reached by water routes. Output of the one mill in the south is shipped entirely by rail, because it is well inland, as are its principal markets.

Greater part of the newsprint imported in to the United States from Ontario, Quebec, and New Brunswick is transported by water, because most of the mills in the eastern provinces are on or near deep water, many of the larger ones being within easy reach of the Great Lakes and St. Lawrence River. Newsprint, imported from British Columbia mills, moves almost entirely by water route to ports in the Pacific Coast States, and some thence by rail eastward, as far as the Rocky Mountains.

During 1920-39, the price of newsprint fluctuated within a considerable range. Although the price had been advancing since early in 1917, it rose still more rapidly in 1919 and 1920, until, in January, 1921, the f.o.b. mill contract price reached a high of $130 a ton.

Upward climb of prices, during and immediately succeeding World War I, had stimulated the construction of new mills in both the United States and Canada. When these mills began production in late 1920 and 1921, the decrease in consumption caused all of them to reduce output, and prices fell, until, by January, 1922, the mill price was $70 a ton. January, 1923, the price rose to $75 a ton, but, in July, following, it dropped to $73; in January, 1925, to $70; and, a year later, to $65, where it remained until July, 1928. After having remained at $62 throughout 1929, the

rapid decline in business activity, after that year, forced several mills to reduce prices, and, by April, 1933, newsprint was quoted at $41 a ton. From that time, through 1936, the price was $42, and, in January, 1937, it rose to $43.50. One year later it increased to $51, where it remained; this figure (the equivalent of $50 a ton delivered New York) being established as the base price for newsprint by OPA maximum price regulation 130, effective April 29, 1942. Subsequent revisions of this regulation increased the maximum price to $55 a ton March 1, 1943. It was made $59 a ton September 1 of the same year; $62 May 28, 1945, and $68 early in December, 1945. About September 1, 1946, the maximum was increased to $75 a ton; and October 11, 1946, to $85. This price, with its zone differentials, applied to all newsprint delivered to consumers within the continental limits of the United States. Price control ceased in November, 1946. April 1, 1947, the price was made $91 a ton by all Canadian and some United States producers.

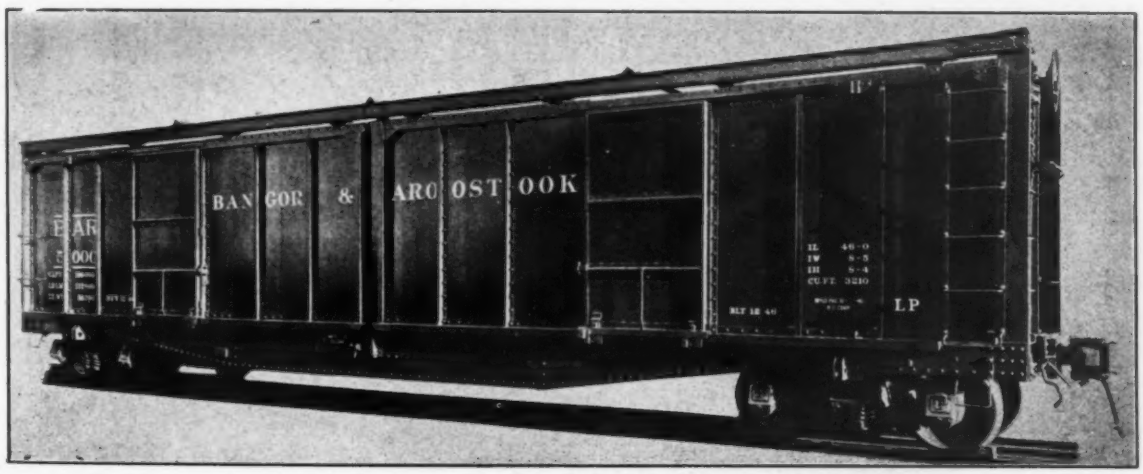
Prices, previously indicated, apply only to roll newsprint, sold on contract by the mill to the consumer, conversion charges and merchants' markups to be added when the paper is sold to the consumer, in some form other than in rolls, or when sold through a jobber or paper merchant. Sheet newsprint usually sells at prices from $5 to $8 a ton more than rollnews, because of the added cost of cutting, trimming, packaging and preparing for market.

During the war, the price of newsprint was too low to allow a sufficient margin of profit, and a number of mills began to make other grades. In 1944, for instance, three or four concerns in the northeastern and Lake States, which were included in the OPA cost studies, lost money, their costs of production ranging from 50 or 60 cents, to more than $20 a ton, in excess of the price at which their product could be sold. In the early part of 1945, two of these concerns, which showed a consistent loss, abandoned the production of newsprint entirely, and others indicated they would do so as soon as the expiration of existing contracts made it possible. This action reduced the domestic output of newsprint, and increased the dependance of United States newspaper publishers on imported newsprint paper.

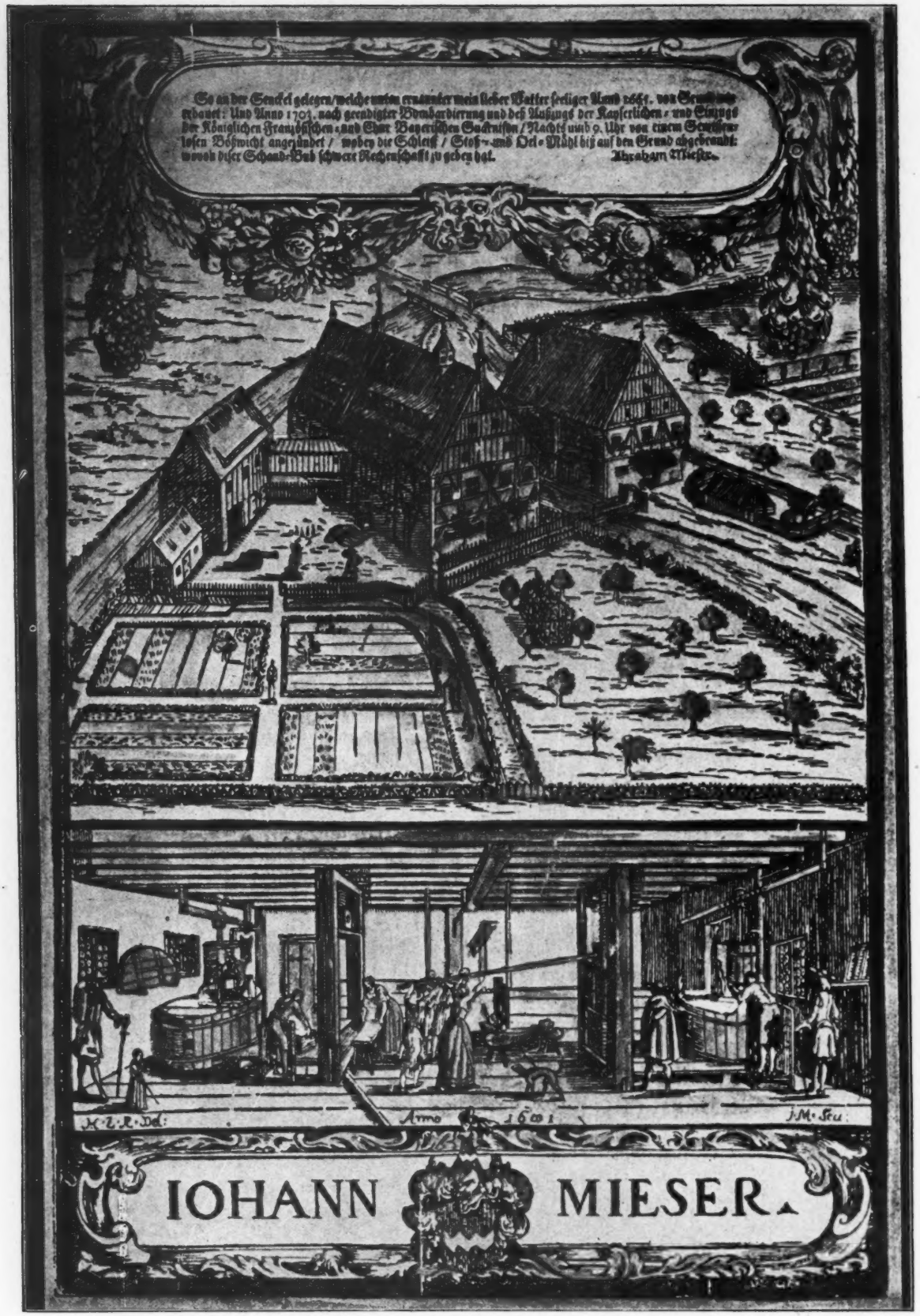
So the newsprint situation has been chaotic for the past several years, perhaps even more so since the past war ceased. Demand continues to exceed the visible supply. This is expected to continue for many months, perhaps for years. Newspaper circulations were never so large, advertising so great. Also, changes in specifications, notably for ilustrated tabloid news, has created a vast alteration in the trade. Big city papers, featuring this popular demand for pictures, with condensed news, require immense quantities of a type of newsprint that was not in so much demand previous to the war. It is apparent, too, that this type of paper shall be in even greater demand, and the other grades, also, are still demanding more paper. Future of the business, then, is apparently a question of supply. This has frequently been a puzzle previously, many times, but, quite likely, never so serious as today.

New Pulpwood Car of the Bangor & Aroostook Railroad
Unloading Almost Automatically

On account of the increase in pulpwood shipments for paper mills, the Bangor & Aroostook Railroad Company has had 100 all steel rack cars built, and recently put into service. These cars are so constructed that they are placed on the Great Northern Paper Company's unloading track, equipped with a special mechanical apparatus. This tilts the car, allowing the entire opposite side to open up at the bottom, whereby the entire load of 23 cords of pulpwood can be unloaded within three minutes.



(Courtesy, Magor Car Corporation, New York)



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Label Nearly 350 Years Old

CHAPTER XVII

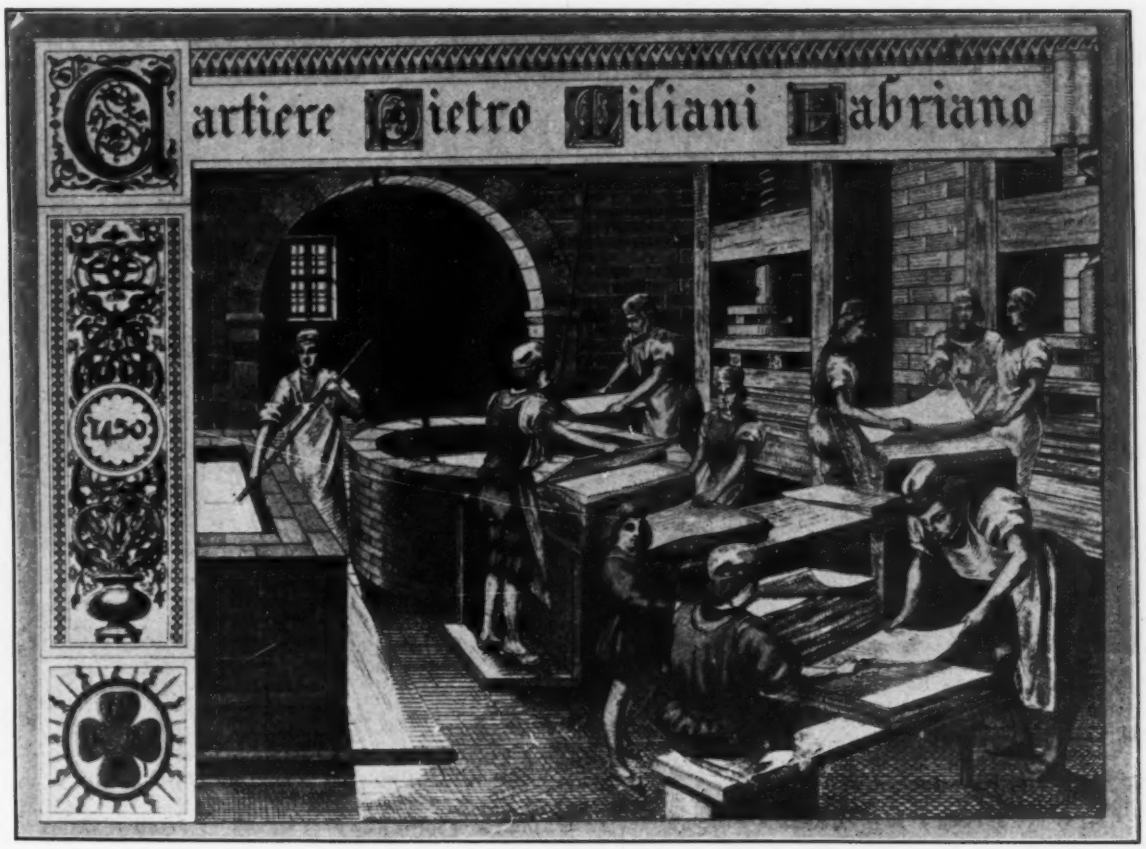
Hand-to-Machine This Industry Went Forward

IN the very gradual transition of hand made paper to machine production the paper industry has a period, forsooth, when the entire industry appeared to stand still. First mention of any sort of machinery in pulp is made in the tenth century, when Spain produced pulp at Xativa with water mills grinding and stamping the raw material with extremely crude equipment. Thus, from the hand made paper of the Orient, through the long years for processing of papyrus and parchment to the age of paper from the antediluvian days of wood, clay, and stone, the eventual evolution to the machine age slowly approached.

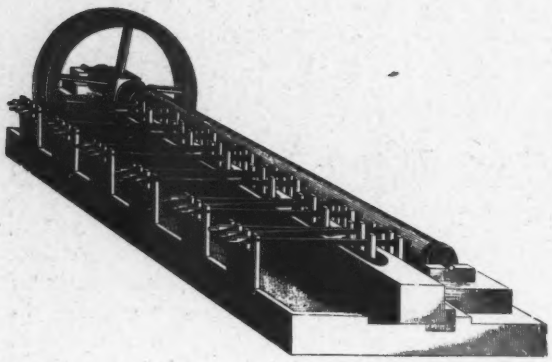
From the use of any sort of material at all for recording, from the mineral age tothe stone and fibre age, the manufacture of necessary pulp by machine became a story of a most tedious progression, frequently of retrogression. Hindered by lack of knowledge, by plain illiteracy, by the favor or disfavor of church and State, the absolute handicaps placed upon any sort of mechanical progress were enormous. Men met torture and death because they happened to advocate small improvements in paper processing. Either through fear and jealousy, competitive twins of trade, the delayed machine age was simply permitted to progress or decay at the whim of those in local authority. Inventors, like poets and composers, were marked men. They could hope for no reward, apparently, other than the personal satisfaction of their possible improvements.

Modern Paper Label from an Antique Italian Hand Mill

A modern paper label from the renowned paper mill of Pietro Miliana, a firm that has made paper in Fabriano, Italy, since the fifteenth century. Many of the elaborate light-and-shade watermarks have been made by this old-established mill. The Fabriano mill remains undamaged, although there was considerable fighting near the valley where it was located.



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)



(From Joel Munsell's Chronology of Paper)

15th Century Stamping Machine

In the year 1330, A.D., the very first Italian paper mill was supposed to have opened. In that year no machinery nor equipment, other than coarsely made hand forms, were used. In France, too, in 1340, ten years later, when the first mill was established near Troyes, nothing was known of any kind of improved equipment. Italians, who had supplied the French paper demands previously, still made all forms of paper by laborious hand production, beating and pulping rags with the slow precision of galley slaves. Fabbriano, in Italy, has been credited with advanced thinking in paper production, and offered the first mechanical beaters, with a water mill.

Odd fact is that the first paper mill in Austria, at Leesdorf, which was in the vicinity of Baden, years and years afterward became a center for modern machine production. But not in that early year 1356, A.D., when the primary paper mill was established. In Germany, some emigrant Italians helped Stromer to set up the first mill in that country. They used two rollers, with eighteen stampers, in 1309, A.D. Even in Tuscany the mills were operated by water power at Colle with the beginning of the fifteenth century, in the year 1400, A.D. No mention is made about improved equipment in the first English mill of John Tate, at Hartford, in 1498. He manufactured hand made paper, evidently without the then so-called "modern" hand machines. Water mills became quite common, evidently, as a sixteenth century English mill in Cambridge was leased for the purpose in 1591, A.D.

In America, meanwhile, the production of paper was unknown. All the English colonies depended upon the mother country. Imports were slowly increasing as more early printers were established, pamphlets printed, even small books attempted. So the familiar story of Wilhelm Ritterhausen, once from Germany with the Mennonites, later from Holland as his name was changed to the Dutch Rittenhuysen, then to the English version of Rittenhouse, was brought forth from the year 1690. At that time the first American water mill was founded at Roxborough, very close to the then limited Quaker settlement at Brother Penn's friendly site of Philadelphia. Hand made paper prevailed, of course, but with the aid of limited water power.

In 1710, A.D., the second American mill, also, using local water power, was founded at Crefeld, near Germantown, Pennsylvania. William De Wees, the owner, was related to the Rittenhouse family, as a brother-in-law of Nicholas Rittenhouse. Nicholas was a son of Wilhelm, or William, the first American paper maker. No other than crude equipment was used, however, as this mill, also, was limited to hand made paper by the use of liquid motive power only.

Additional mills were quickly established in the colonies of Pennsylvania, New York, and Massachusetts. They invariably used water power, little of a more modern nature in equipment. New Jersey, too, sought a mill, and got it at Elizabethtown in 1728. William Bradford owned it, and this is supposed to have been the first in that restricted area.

In England it was mentioned, in 1746, that the Brothers Potter had, at Manchester, a fabled giant machine to make colored textiles, four shades or tints at a time. With eight machines they were credited with making 8,000 to 10,000 rolls daily, a forerunner of the paper machine. Holland is also credited with the first cylinder or engine method for production of rags from the raw state to pulp. This was in 1750, or thereabout. That same year Baskerville, to smoth laid paper, used woven molds. American mills still produced their pulp by hand beaten hard work. As late as 1756 they were still pounding the rags. In 1759 the hand stampers

(Courtesy, Dard Hunter Paper Museum, Mass. Inst. Technology)

Paper Label of the Ancient (1530) German Mill of Andreas Bernhart

abroad were slowly changed to cylinders with sharp steel knives. This idea also came from Holland, plus the use of their characteristic wind mills, but the power was at the mercy of the weather.

Connecticut established its first mill in 1768 at Norwich. Christopher Leffingwell was the owner. Even the Colonial Legislature promised him a bounty, as was the custom of the times, to proceed with his mill and manufacture of paper. He received a bonus of two pence the quire, that is, for writing paper; one penny on printing and wrapping paper. He had made 4,020 quires of writing and 10,600 quires of the common paper when the Legislature in 1770 withdrew this "liberal" offer.

Third Rittenhouse Mill, Built Prior to 1770

In 1770 there were precisely eleven mills in Holland using the then new cutting and grinding engines, driven by variable wind mills. Ratio of performance was about one hour of machine to six by hand, as operated by the competing water mills in nearby Germany. In 1789, mallets were still used in France, at Angouleme, to beat the hand made stock. This sort of paper cost ten cents the pound, and it required 600 men to do the work in total production.

So crude were the American paper mill processes in this year, 1789, that even Benjamin Franklin tried to get the mills to make paper in larger sizes by using Chinese molds, heated in kilns to join the sections, while the American method was still that of the two smaller sheets, pasted together, then hand burnished with a flint. By the Chinese method, Franklin said, the sheets could smoothly be made fourteen by five feet. By the American method the sizes were various.

And the methods in Europe were equally crude. Owners of mills had to labor in hand production with

A 1606 Sketch of an Old Paper Mill

A drawing of the interior of an early seventeenth century paper mill depicting the stampers used in macerating the linen and cotton rags, previous to making into paper. This is the only known contemporary drawing representing this period. Artist is unknown, but the drawing, in several colors upon thick paper, is clearly dated 1606.

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

18th Century German Steel Engravings of Paper Industry

Two eighteenth century German steel engravings, etched by hand, showing the rag-picker, with her basket of linen and cotton rags upon her back; the vatman, sitting upon his vat, surrounded by the various tools of his trade. Such prints as these are of minor value, from a technical standpoint; but, in a Paper Museum, it is essential to depict every phase of the papermakers' craft, from all periods and from all countries. Material, such as these prints, must be part of any collection of "paperiana"

their workmen. In fact, at the time (1790) entire families worked at the tiresome job in France. Demand for paper was increasing, all over the world, but the mills could hardly fill the requirements, especially for larger sizes, and for better paper. Much of the production, in both America and in Europe, was so coarse and poor as to be classified with the commonest of wrapping paper, even of that day, when very little was expected of paper production, here or abroad.

But the day was rapidly approaching when paper machines were to make endless miles of paper. Although few had knowledge of it, a paper workman in France, Nicholas-Louis Robert, was experimenting with a machine of that sort. It was in 1798 that he made, in the mill of Francois Didot, at Essone, the first model of his proposed paper machine. He claimed paper, in one sheet, twelve feet wide, fifty feet long, and no one, of course, believed him. And he proposed to do it with the aid of just one man, plus the machine.

At Vougeot, in France, in 1799, there was a mill with twelve engines, twenty vats. At that time, too, Robert secured his first paper machine patent in France. In the following year, 1800, at the very start of the inventive nineteenth century, Robert obtained 8,000 francs from the French Government to perfect his machine. His patent was to run fifteen years. Here, however, Robert encountered remarkable difficulties. France was involved in all sorts of enormous economic and domestic troubles, following her numerous wars. Experiments with the paper machine were expensive. Robert had very little cash. So he arranged with his mill owner, Didot, to have a certain John Gamble present the matter to English financial interests. He also needed mechanical assistance. Therefore, the model was taken across the channel.

In the meantime, the balance of Europe and America was still working with old fashioned equipment, if any at all. In Russia, in 1800, a mill at Jaroslow had twenty-eight engines, seventy vats, plus another mill of thirteen engines, thirteen vats, little else in required equipment to make other than wall paper, which was then enormously popular with the Moscovite well-to-do.

Leger Didot, with John Gamble, the Englishman, offered the Robert paper machine to all comers. In 1801 they secured the first British patent for the machine. To do this, Didot had signed articles to pay 25,000 francs to Robert for both model and patent. This caused the registration of numerous other patents, all said to be improvements on the original Robert invention. In the following year, 1802, both England and France issued papers of protection. And, in the next year, 1803, Bryan Donkin, in England, after three

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

A Dutch Paper Label

A Dutch paper label from the late enghteenth century, such as used by the paper manufacturers of Holland for wrapping reams of paper. This label is printed in dull red upon grey paper. The Paper Museum has an extensive collection of paper labels from Asia, Europe and America. Many of the American labels are finely designed and printed from steel plates, showing early mill interiors, equipment, etc. It is chiefly from the early paper labels that the architecture of the pioneer American mills may be studied

64 YEARS OF *"KNOW-HOW"* ARE AT YOUR SERVICE TO HELP YOU DISPOSE OF MILL OVER-RUNS AND SECONDS!

SINCE 1884 The Sabin Robbins Paper Company has served the paper mill industry of America in disposing of job lots and seconds. And, while serving the mills, we have also performed a valuable service to the printing industry in making available to printers varieties, sizes and quantities of paper *from one central source* which printers would have difficulty in obtaining from any other paper organization. That there is a definite need for this efficient, two-way service is proved by the growth of the Sabin Robbins organization. More and more mills turn to us for disposal of job lots and seconds as printers in increasing numbers call on our national organization for papers of all kinds. Next time call us. You'll do better with Sabin Robbins.

WHAT'S YOUR PROBLEM?
WE CAN HELP YOU!

WHAT'S THE PAPER?
WE CAN MOVE IT!

Are you making special paper runs designed to fit only particular jobs? Are you having trouble disposing of over-runs and seconds? Let us know your problems. We can take the paper off your hands because we know where we can dispose of it quickly. We have buyers waiting for papers of all kinds in all sizes and quantities.

THE SABIN ROBBINS PAPER COMPANY

SINCE 1884, NATIONAL DISTRIBUTORS OF JOBS AND SECONDS

CALL THE SABIN ROBBINS OFFICE NEAREST YOU!

NATIONAL COVERAGE ASSURES QUICK MOVEMENT OF ANY SECOND OR JOB LOT!

America's Leading Bargain Paper House has Offices in 17 Principal Cities . . . .

★ ★ ★ ★ ★

●	ATLANTA 3, Georgia	121 Courtland Street, S. E., WAlnut 6476-7
●	BALTIMORE 23, Maryland	2401 Frederick Avenue, EDmondson 4032W
★	BUFFALO 10, New York,	189-199 Van Rensselaer St., WAshington 7894-95
★	CHICAGO 23, Illinois	2717 S. Troy Street, BIShop 6400
★	CINCINNATI 23, Ohio	3800 Ludlow Avenue, KIrby 3737
★	CLEVELAND 4, Ohio	7800 Bessemer Avenue, MIchigan 8554
★	DETROIT 16, Michigan	1401 Fourteenth Avenue, TAshmoo 5-3280
●	KANSAS CITY 2, Missouri	3527 Broadway, WEstport 4950
★	LOS ANGELES 15, California	1145 Wall Street, PRospect 2103
★	LOUISVILLE 2, Kentucky	229 E. Washington Street, WAbash 1353
●	MILWAUKEE 3, Wisconsin	238 W. Wisconsin Avenue, MArquette 3030
●	NEWARK 2, New Jersey	222 Market Street, MArket 3-5112
●	NEW YORK 7, New York	41 Park Row, COrtland 7-2713
●	PEORIA 5, Illinois	112 Milton Street, Phone 20913
●	PITTSBURGH 22, Pennsylvania	402 Bessemer Bldg., COurt 1766
★	PHILADELPHIA 4, Pennsylvania	15th & Carpenter, KIngsley 5-1510
●	ROCHESTER 4, New York	723 Case Bldg., STone 6670

Sabin Robbins maintains offices in 17 cities, strategically located throughout the country. Each office is staffed by experienced paper men . . . men who know how to *buy* because *they know where they can sell* job lots and seconds. This national distribution set-up assures quick movement of any kind of paper from your mill to printers. Printers know Sabin Robbins not only as the Bargain Paper House but also as the Variety Paper House. You have the paper and we have the organization to distribute it to waiting printers. Next time call us! You'll do better with Sabin Robbins!

THE SABIN ROBBINS PAPER COMPANY

SINCE 1884, NATIONAL DISTRIBUTORS OF JOBS AND SECONDS

CALL THE SABIN ROBBINS OFFICE NEAREST YOU!

busy years of experimentation, made the first almost automatic paper machine from the Robert plans. It was a great success, on paper, and no pun intended, yet a failure in both financial production and manufacture for immediate practical use.

But two booksellers and stationers in London were watching the Robert and Didot promotion with care. They were Henry and Sealy Fourdrinier. They had some ready money, so they bought the Didot and Gamble patents. This is the way the original inventor, Nicholas-Louis Robert, lost his interest and name in the present Fourdrinier machine, which is still making untold miles of paper as this story is related. Their first experimental shop, at Boxmoor, England, was a costly place to produce the eventual machine to make paper.

Donkin made a second machine at Two Waters, England. In 1804 he made a practical machine, but it was not popularly used, even yet. Mill owners were suspiciously uninterested. They said they could still make paper cheaper by hand. And even better—which, of course, was a question. No one knew, exactly, whether the ballyhooed Fourdrinier, of the time, was a precise success or a foolish failure. No one knew, in fact, anything about it, except what the promoters said.

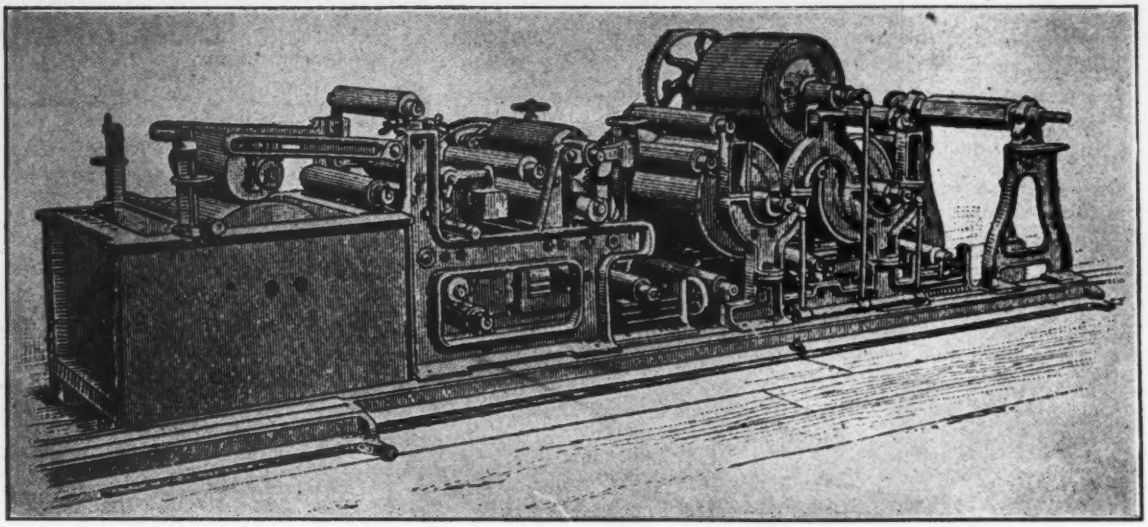
In the following year, 1805, Donkin changed the position of the cylinders on the Fourdrinier. He thus eliminated the upper webbing. This simplified the machine, as the webbed pulp had to pass through the rollers. One machine could now empty six vats in twelve hours. That was the then accepted period of daily employment, not the six or eight hour work day of our current set-up. By hand, the old method required three months to work rags into final paper. By Fourdrinier, crude as it then was, the job was completed the very next day.

To prove that their invention and production were

Painting of Interior in Old French Handmade Mill

A painting of the interior of a French paper mill from the middle eighteenth century. All of the necessary workmen and equipment required in the production of handmade paper are depicted—the rag receptacles, the stampers, the vatman at the dipping vat, the "coucher" with his felts, the "layboy," and, lastly, the press used in expelling the water after the "post" of paper had been formed. It is not clear just why the workman is so enthusiastically leaving by way of the open window, but, perhaps, he has had his fill of papermaking.

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)



(From THE PAPER TRADE JOURNAL *of October 16, 1897)*

Smallest Paper Machine in the World, Up to 1897

successful, the Fourdriniers published a statement that seven vats of pulp were handled daily by their machine. With hand work, the cost of operation and employment on annual production of paper was exactly £2,604:12s. By machine, £734:12s. Saved, £1,870, quite a tidy sum for even those low cost days. Hand made paper then cost 16 shillings per hundredweight; by Fourdrinier, 3 shillings, six pence. Almost anyone could see the advantage, yet few appeared to appreciate it. In 1806, progressive enterprise of the paper industry was evidently at a low water mark.

But the Fourdriniers were nearly at the end of their financial rope. They went before the British Parliamen to state that the experiments on the Robert idea had already cost them £60,000. Their machines then sold for £715 to £1,040. In 1807 they were almost bankrupt. And, the next year, 1808, John Gamble, the original English promoter of the Robert or Fourdrinier, was broke, after eight years of intensive effort to manufacture and market the machine. So he told the Fourdrinier brothers that they could have his interest in the thing, undoubtedly for money advanced during that period.

Dickinson, a year later, 1809, invented a competing device to the Fourdrinier. He was a mill owner, and a prosperous one. In England he was noted for his endless enterprise. His idea was to eliminate the traveling wire, substituting a polished, hollow, brass cylinder, with perforations, covered with wire-cloth, revolving over the pulp. Water was sucked up by refraction, thus moving the pulp onward to ultimate rolling.

But Didot, in France, also broke, could not fulfill his agreement with Nicholas-Louis Robert, so lost his interest in the original French patent. This was in 1810.

Three years later, in 1813, a machine was patented in England for cutting waste into the required shredding process. And the Fourdrinier, still improving, now made endless streams of paper with three men per machine, instead of the usual five. These men required no especial skill, except as mechanical observers. Alexander, of Russia, heard of the English machines. He came over to the British Isles, and asked English paper makers to go back to Russia with him and the machines he bought. They did, and the Russians built a new paper plant at Peterhoff in 1814.

In the following year, 1815, the first paper machine was built in France, home of the invention. It was precisely sixteen years previously that the idea was hatched in France, yet nothing had been done about it until now. And the French model was not as complete as the English machine, which was now also being sent to France. An entire day was required for three men to make 4,000 small sheets of paper by hand. This the machine could do, and better, in almost that many seconds.

In 1816, a Pittsburgh, Pennsylvania, mill was organized with one steam engine having sixteen horse power. This was quite an innovation for the time. But the very first paper machine to be used in America was placed the following year, 1817, on the Brandywine River, in Delaware, near Wilmington. Thomas Gilpin & Company were the proud possessors of this machine. It was part of Gilpin's own invention, with the cylinder. Poulson's Daily Advertiser was the first paper to be printed from this paper. It required ten vats to make it. It was the widest sheet made in this country, and of any required length desired.

In 1818 Roger Didot was in England. He had left his paper mill in France. And he now produced an invention, which he immediately patented, to improve the paper machine for making wove paper. He also made laid paper in continuous lengths or in separate

sheets, as required. That same year a paper machine was shipped to Berlin, then in Prussia. But, withal the progress made in production, paper was still dried in old fashioned lofts in 1820.

By this time, too, many machines were coming to America, from both England and France. They were extremely expensive to the then small paper industry of this country, so were not especially popular with the mills. Gilpin, at Wilmington, had increased capital to half a million dollars, a very large sum for that day and date. Odd fact is that even Congress was using English imported paper, although the Gilpins offered their own at 25% less than the English price.

And Simeon and Asa Butler, in Suffield, Connecticut, were making the first American writing paper to be furnished the Congress in 1820. Even Congressmen thought the English paper was much better than our own. But the paper mill people, in both Delaware and in Pennsylvania, asked Congress to put on the first American paper tariff, to keep British and other foreign paper off our market.

T. B. Crompton, in England, made another improvement in 1821 to the paper machine. He dried and finished the paper, as it came off the machine, with heated cylinders. He used cloth for protection, and also had mechanical shears to cut the paper in any length desired. So the resulting finished paper was of much better appearance, as it came off the rollers, and was then cut and packed.

All the expensive new machinery of the Gilpin firm was wiped out by a most disastrous flood in 1822. Gilpin was practically destitute after this disaster, which engulfed his entire mill on the Brandywine. That year, also, John Ames, in Springfield, Massachusetts, invented a cylinder machine. In 1823, Canson, at Annonay, France, had an English Fourdrinier machine. This was so unusual as to arouse comment at the time. As if the Gilpins had not enough trouble already, their new mill, nearby the former flooded plant, caught fire and was destroyed in 1825.

One of the largest (if not the largest) mills in the United States, at Springfield, Massachusetts, operated by the aforementioned D. & J. Ames, had twelve engines in 1825. They were very successful, for a

Paper Ream Wrapper from Holland, Nearly 200 Years Old

A paper label formerly used in wrapping reams of paper. Pictorial labels, of this kind, have been used in Europe since the sixteenth century. This particular example is of Dutch origin, and dates from about 1750. Earliest paper label in the Paper Museum collection is German, date 1520

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

(Courtesy, The Davey Company)

Breaker Beater Eating Up Raw Paper Stock

time, then hit the rocks as they extended their business to include the publication of the first Webster dictionary.

Canson, in France, about 1826, just used the Dickinson principle to the improved Fourdrinier by getting air reduction to operate through suction pumps below the surface of the webbing. This was an idea he had had in his head for six years, as a secret process. At this time, too, Firmin Didot used the Crompton method at his French mill, in Mesnil, to dry paper. It was the very first use of this method in France.

In Denmark, also, at this time, the first paper machine was shipped to the State mill at Fredericksburg. It had been built in England by Donkin. To Sicily went the first machine through Firmin Didot and his brother, with the aid of Lefevre. In 1827 there were exactly four paper machines in France. That first one came over from England in 1815, but England, itself, had been using them for fully twenty-five years, now.

Machinery was supplied at Chambersburg, Pennsylvania, in 1828 to make straw and blue grass paper. It was patented by William Magaw. Three hundred reams daily were indicated from the invention. James Palmer, that same year, took out an English patent on molds, also for other equipment. Dickinson, still monkeying with the paper machine that year, invented a rapid vertical movement for the traveling web. Donkin, emulating him, made an even better improvement for the elimination of uneven pulping in the paper, as completed.

Moses Beach, in Springfield, Massachusetts, invented a machine in 1828 to cut rags. Beach afterward got control of the famous New York Sun. In France, too, Victor Odent, at Courtalin, took out a patent for a new paper machine. Cowper, in England, that year, also obtained a patent for a cutting machine. Crompton and Enoch Miller, in England, took out a patent on cutting the paper from the machine lengthwise, by revolving circular blades. They were placed upon a roller parallel to the cylinder, as the paper revolved, to be unwound. Mason Hunting, in Watertown, near Boston, Massachusetts, took out a patent on top press rollers, so that any thickness of paper could pass between in one operation.

That same year, 1828 (evidently *the* inventors' year) Marsden Haddock, in New York, invented a machine to make paper in the sheet with a dipping process. It accomplished more than the previous hand operation. William Debit, too, found a way to make a machine to clean rags. Dickinson, the next year, 1829, took out additional English patents to improve the paper machine with new cutting devices.

But it remained for an American firm, Smith & Winchester Manufacturing Company, at South Windham, Connecticut, to produce the first Fourdrinier in America in 1829. It was built for the mill of Amos H. Hubbard, at Norwich, nearby. It was without driers,

And So It Comes to the Mill—Raw Paper Stock in Bales

(Courtesy, The Davey Company)

so the paper had to be hung up, as usual, and dried in the good old high loft way. This was, indeed, the beginning of an era. Although few American paper mill operators realized it, at the time, this innovation set the pace for the United States to eventually lead the world in paper production, therefore in practical knowledge, general education, economic progress.

In that year, also, 1829, Isaac Saunderson, of Milton, Massachusetts, made an improvement on the cylinder machine. This corrected the glaring fault of the machine, unevenly made paper. Hand paper was still supreme in even distribution of the pulp in the molds. So Saunderson made a horizontal whirl-wheel, plus sheet forming rollers. In this way printing paper, pasteboard, and other box papers, were made more substantially and much stronger.

Reuben Fairchild, likewise, thought out a clever plan to make paper stronger in mixed fibre content. This he did, in Trumbull, Connecticut, in 1829, by producing an agitator, a semi-cylindrical cradle of metal in the vat. It was made to vibrate the direction of the cylinder length. Odd transaction, but Culver and Cole, of Massachusetts, applied for a similar patent at the same time. Both patents were ultimately owned mutually.

In France, that same year, the mill owners were so satisfied with their English machines that they said they didn't want the new French model at all. But a French machine was sent to an American mill at Windham, Connecticut, that same year. Thomas Cobb, in England, made a useful machine addition for tinting the paper and embossing it. This he did by pressing the pulp between rollers or plates, which were engraved with the trade-mark, or name, desired. Six machines in Massachusetts that year were in operation in the State's 60 mills. G. A. Shryock, in Philadelphia, said he was the first man to make paper and boards from straw and grass with a cylinder machine. Paper like that sold for $2 the ream.

In 1830 there was a tremendous and increasing struggle for supremacy between the machine and hand made paper. French hand made paper was almost perfect by this time. It competed equally with the machine, as that product, although cheaper, was not so fine. A Whitehall, English, mill made paper, in this year of 1830, which was 13,800 feet long, four feet wide. This was in Derbyshire. Richard Ibotson, in England, invented equipment to take the knots out of raw material. Sieves and strainers failed to accomplish this, so the Ibotson idea eliminated the hand picking, previously in vogue.

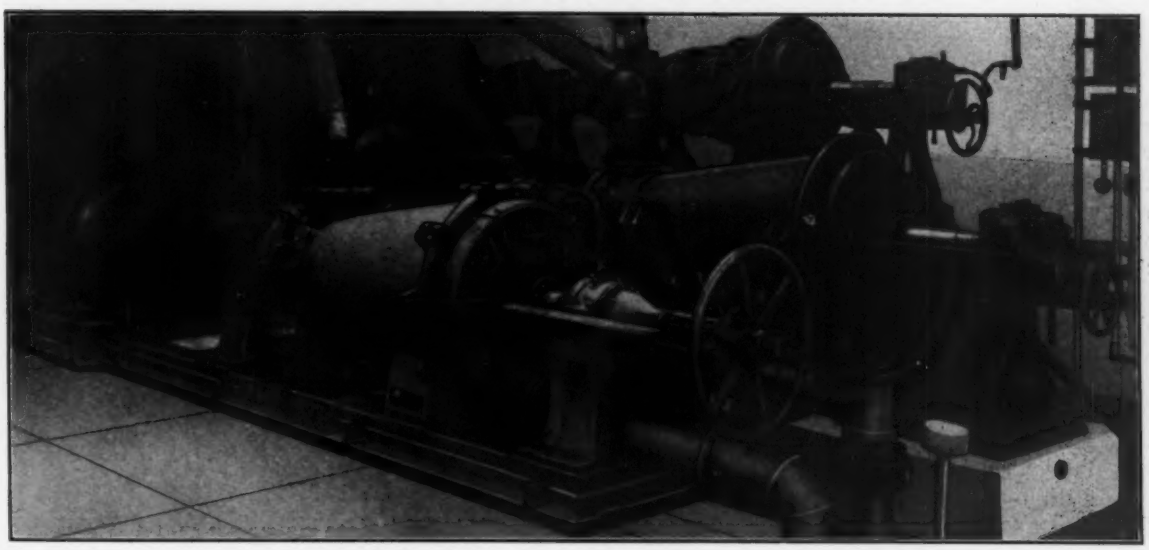
Phelps & Spafford, at a shop in Connecticut, made machines in 1830 which made good paper. John Hall, in England, managed to perfect an idea which was a modification of the Dickinson plan. Dickinson's cylinder-mold was now supplied with more water for the vat, thus greater pressure was brought to bear on the outside of the cylinder. This caused the pulp fibre to adhere to the molds more closely.

John Wilks, in England, created an improvement for the Fourdrinier when he added a perforataed roller in 1830 to aid the escape of water from the pulp-web. This was before it was passed to the pressure rollers. And this was the forerunner for the now famous model of the present "dandy."

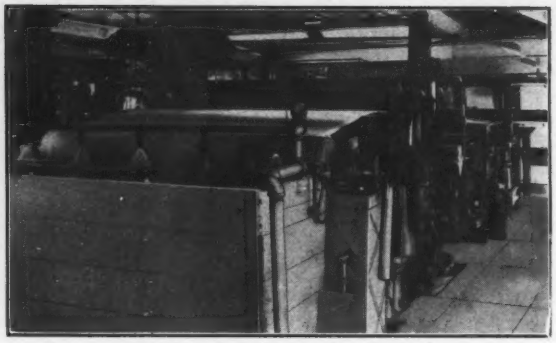
Dickinson, always busy on some paper project, made the 1830 improvement of making paper in two layers. This was brought together on a second cylinder, so forming a solid substance. In this manner the extra heavy paper was created for many new industrial uses.

Thomas & Woodcock, in Brattleborough, Vermont, managed to make a pulp-dresser in 1830, too. Thomas Gilpin, not yet knocked out of the paper trade, contributed a cylinder improvement that calendered paper

Jordan Engines at Work, As a Battery Refines the Stock



(Courtesy, The Davey Company)



(Courtesy, The Davey Company)

Wet Machine Forming Sheet, Also Piling and Cutting

with a highly polished surface. Thomas Barratt, in England, that year, placed a watermark on continuous paper which resembled that of the hand made sort. He also made cast iron rollers of greater perfection than the ordinary lathe turned rollers for finishing paper. Accurate rollers were produced by permitting water to flow over them, for weeks, so that the grinding process would be accomplished without the usual emery or other abrasive.

In France, in 1831, Jean Jaquier made a device to make paper continuously with wire marks, to resemble laid paper. Chambersburg, Pennsylvania, always a progressive paper town, now proposed to build a mill with eight machines. This was to manufacture straw paper, only.

Edward Pine, of Troy, New York, perfected a machine in 1831 to cut paper on cylinder machines while the paper was still wet, a thing not previously accomplished. This year, also, E. N. Fourdrinier improved the transverse cutting of the paper web into any desired size. John Ames, again, in Massachusetts, introduced a wire cloth cylinder to carry off waste matter. This was a substitute for screens or washers, then so crudely doing the job by halves.

James Sawyer, in 1832, made a machine to clean paper pulp. This was the piston pulp-strainer, different from the Thomas Woodcock invention. Francis Goucher, in Pennsylvania, also made a machine to clean pulp. Samuel Foster, that year, produced a machine to clean rags at his shop in Brattleborough, Vermont. John Ames, again in stride, made a machine to size paper pulp, to act as pulp-dresser. That same year the New York Journal of Commerce commented that, although this newspaper used a sheet a quarter size larger than five years previously, it only cost three-quarters of the money.

Henry Brewer, in England, discovered a way to improve the Ibotson parallel rod-strainer. He made square boxes with grid iron bottoms, with powerful vibrations to the pulp. This was up and down in the tub, with the aid of levers, cranks, and shafts. Joseph Amies, of England, too, that year of 1832, made a contribution to the paper machine by a new sieve, which eliminated pulp lumps.

At that time, too, in 1832, Jarvis & French, in New York State, Tompkins County, perfected a paper presser by passing pulp through two hollow metalic rollers. This was used at their Falls Creek mill, at Ithaca, where, only a few years previously, Indians of the Six Nations had so freely roamed. And Coleman Sellers, down in Philadelphia, also made a separator, or pulp dresser, that eliminated waste matter from the raw material. In England, again, the Towgood paper cutter came out. This dispensed with the old reel, and cut the finished stock as it came directly from the steam cylinders.

In Brattleborough, Vermont, that home of Yankee paper inventors, Samuel E. Foster, in 1832, made perforated rollers, containing water or steam, to clean paper makers' felts. Knowlton & Rice, at Watertown, Jefferson County, New York, introduced the first paper machine in the French Black River territory. France practically stopped making paper by hand. Machines had at last conquered the objections of the ancient French mill owners.

In the next year, 1833, Henry Davy, in England, made a rag cutter having an endless feeding cloth, which passed through the raw stock to rotary cutters, so downward to an inclined sieve, where an agitator shook out the waste. Sydney A. Sweet, in Tyringham, Massachusetts, created a pulp sifter, which contained a sieve, somewhat similar to that used on other machines. Two paper machines, in England, turned out 14,000 reams of paper annually. This was believed to be remarkable in 1833.

At Watertown, New York, again, Clark Rice perfected an improvement in pulp washers. This was in 1834. John Ames, too, invariably busy in mind and body, put forth a Springfield, Massachusetts, cutting machine to make sheets of any length desired, just as they came from the drying cylinders. He also, at this time, made a machine to cut and trim paper by the ream. This idea had been used previously, however.

In 1834 fully a dozen paper machines were in operation in France. But they had been made in England, not in France. Hand made manufacturers had been losing money, hand over fist, and they came to believe the English machine was a life saver, indeed.

In the following year, 1835, William Debit, at Hartford, Connecticut, once more demonstrated his ability as a machinist by making a new fangled duster with shafts of knives and beaters. John Ames, up in Springfield, Massachusetts, was again occupied, too, with a new drying cylinder, and in its manner of attachment to the paper machine.

In Scotland, James Brown, at the Esk mills, near Edinburgh, was busy with a plan to create air reduction under the web of the paper machine. For this he used a rectangular box, transversely beneath the horizontal wire-cloth, minus the usual perforated cover. His patent was dated 1836. And Robert Rose's estate, at East Hartford, Connecticut, took out a patent on placing the web of wire in a slanting position on the

paper machine. This formed the end and part of the bottom of the vat containing the pulp, which drained through the web, and thus came forth again to make the final paper.

John Ames, in 1837, brought out his Springfield, Massachusetts, machine to size paper. He did not use either felt or jacket. Crompton, the English inventor, previously mentioned so many times in this record, brought out a new refraction method under the wire cloth of the paper machine, by means of a fan in 1839. In the following year, 1840, there were 280 Fourdrinier machines in paper production for England, Scotland, and Ireland. These machines had lowered the prevailing price of paper more than 50%.

Two years later, in the United States, along in 1842, it was claimed that total machinery and paper mill property in this country was then worth 16 millions of dollars. And these mills made 15 millions in paper. Raw materials were worth 6 millions. Some 175 millions of pounds of paper were manufactured in the U. S. that year. And 50,000 to 60,000 people were engaged in the industry. All this from the birth of the paper machine, practically, only a bare dozen years previously in this country.

About this time, also, the first practical wall paper printing machine was made and used in the United States. It printed the paper in color, where, previously, the so-called "hanging" paper had to be stamped by hand.

Great things now happened in the paper industry. It all appeared to occur within a few years—or even a few months. From making paper by hand, in the old fashioned way, the transition had been slow, very slow, to the adoption of the machine. But now came the wood grinding pulp machine. It was brought out in Germany by Friedrich Keller, who, actually, had invented it in 1840. But Heinrich Voelter bought the Keller patents in Saxony in 1846. Almost over night, then, the problem of scarce rags became a solution in plentiful wood pulp.

But improvements to many machines were still going on in this country. In 1843 James Phelps, at West Sutton, Massachusetts, produced superior equipment for the washers. He made an adjustable, rotating water elevator and strainer. This was lowered and raised in the vat of the washing or beating engine. He also made a rotating screen, or strainer, to strain the water from the pulp. It was claimed to be superior to a cylinder screen, easier to repair.

That year, too, Great Britain was using 367 paper machines. In the following year, 1844, the British mills had 370 machines, a slow growth in equipment, indeed. Austria, the next year, 1845, had 40 machines. In 1846, Prussia, then separate from the other German States, had 72 machines. Bavaria, that year, ilsted only 11 machines. Saxony, with its forthcoming production of the wood pulper, had only 6 machines that year of 1846. Grand Duchy of Hesse had but one machine. But the electorate of Hesse had 6 machines, as distinct entirely from the Grand Duchy. Baden used 14 machines, Nassau 6. Great Britain, meanwhile, had increased its machines in 1846 to 384, thus easily outdistancing the rest of Europe, and, in fact, the paper world, at that time.

It was in 1847 that David Ames died at Springfield, Massachusetts. He had been a foremost mill owner, also an enterprising man in placing the latest equipment in his plant. He was 87, and had been busily engaged in paper for 50 years. That year, too, Great Britain boasted of 405 paper machines. Only two mills in the United States continued to make paper by hand. Voelter, in Germany, had improved the Keller wood pulper, and was making quite a bit of newsprint for local papers.

By the year 1848 Great Britain had added only two more machines, to a new total of 407, using 367 vats. But this historic year appears to have been a noteworthy time for the invention of paper cutters. Machines of that sort were perfected in the United States that year by Zenas M. Crane, at Dalton, Massachusetts; by Geo. L. Wright, of Springfield, same State; by Mark Wilder, of Peterborough, New Hampshire;

Piling and Cutting Table at Other End of Wet Machine

(Courtesy, The Davey Company)

(Courtesy, International Paper Company)

Like a Sheet of White Glass the Long Fourdrinier Brings the Paper for the Waiting Demand

by J. C. Kneeland, of Troy, assisted by Geo. M. Phelps, also of Troy, New York; and another by a Troy man, Alonzo Gilman. This, indeed, was the cutters' birthday anniversary.

Belgium, that next year of 1849, was backward with machinery and modern equipment, for that time and date. It had 22 steam engines listed, with 254 horse power. Also, two old fashioned horse mills, with two horses, each. And 68 water and 7 wind mills were in operation. Nothing is said of paper machines, but there must have been a few, as nearby France had given up hand made paper, and was using machines. So was Germany, and Holland, too, had made many machine equipment improvements.

That year of 1849 was notable, also, for the pioneer installation of machinery to make laid paper at Herkimer, New York. A. H. Laffin made the paper, and White & Sheffield ordered it made as the first of its kind on such a machine in this country.

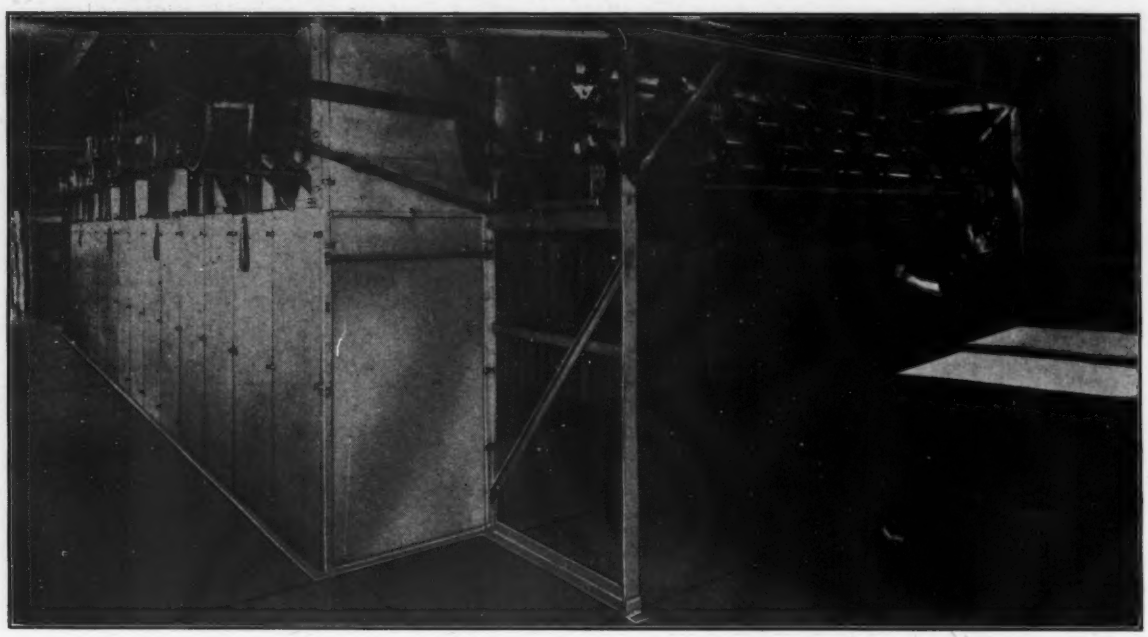
In England Amos & Clarke took out a patent for a paper machine strainer in 1849. They also invented a new paper cutting machine. This took care of the increasing speed of the paper machine. Previously, the speed caused irregular length paper from the cutters. But only 406 machines were in operation in Great Britain that year of 1849, as there seemed to be a loss of one machine somewhere. France, though, made an event of the establishment of the first wood pulper machine in 1849 at the mill in Souche.

In the following year of 1850, half way through the famous inventive nineteenth century, the Bryan Donkin firm in England reported that they had already made 191 Fourdrinier machines. Two of these machines were supposed to be in this country. And the German Zollverein said they were using 116 machines that year.

In France, Didot stated that there were 200 machines. Each French machine took 60 workers; vats took 10. All Britain reported 412 machines for that year. It also had 1,374 beating engines. Henry Pohl, in Paterson, New Jersey, made a new regulator, or pulp meter. This measured the quantity of pulp for webs of different sizes.

In a summary of the progress of paper machinery in nearly 700 years, the story is far from complete. But we have seen the tale of travail in paper machines, and in labor from hand to water, wind and steam, in this time. Men have brought forth, evidently, what is to be a tremendous industry. Not only in the pioneer paths of Europe, where certain machine progress was made with great effort, but in America, where progress perhaps, is always easier, simpler. With the birth of the Fourdrinier the entire world industry in paper stepped forward with seven league strides. Europe

Hanging It in the Dryer



(Courtesy, The Davey Company)

made many improvements to the Fourdrinier, it is true. But to America we must look, henceforth, for the absolute practical progress which is to establish the United States as the leading paper country.

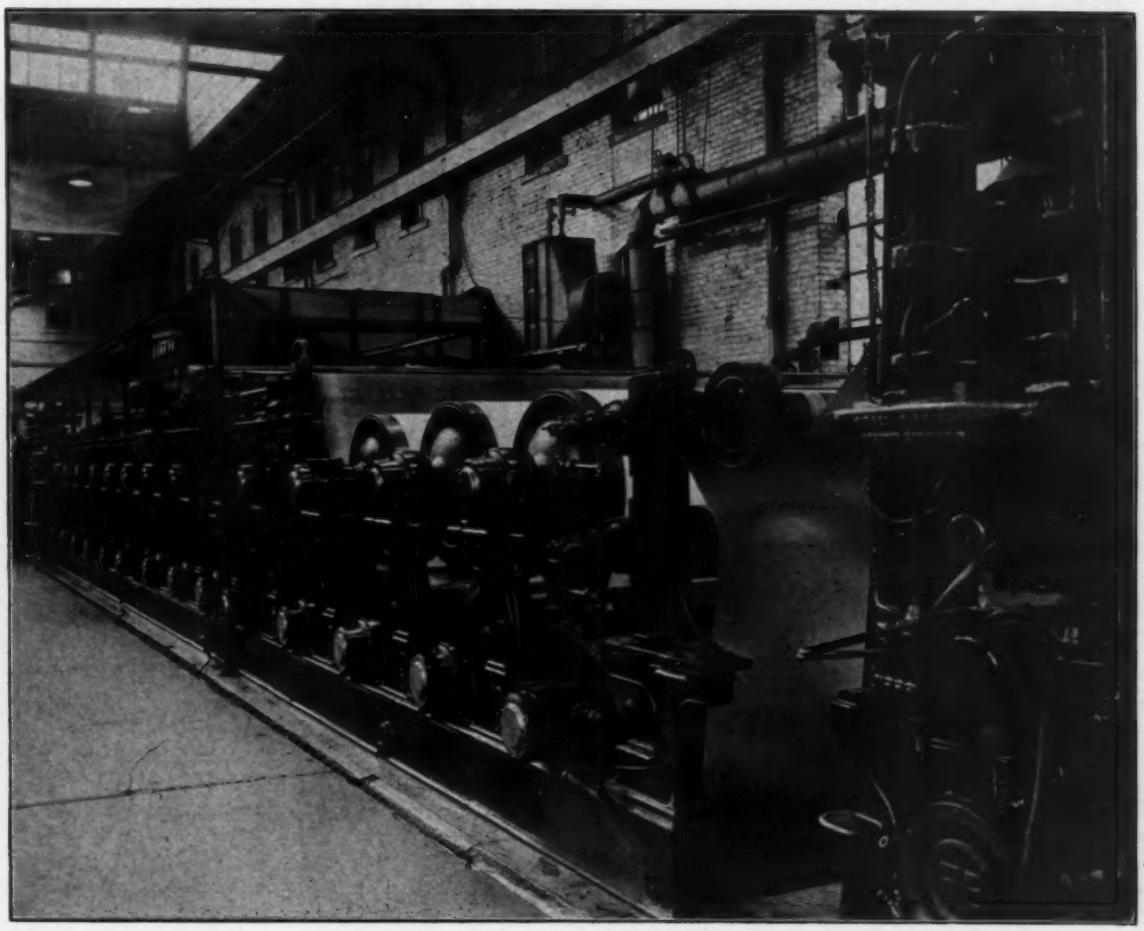
Everyone in this country knows why this is so. And Europe, too, knows why it is true. Paper, as mere paper, is just another piece of merchandise, another useful product of man. But paper, plus printing, from the pens and the coming of typewriters of folk who constantly demand more and more paper for their necessary work, is another story entirely. And the demand in the United States surpassed all other nations because of the previously mentioned requirements of improving knowledge, of that insistence upon common and uncommon schooling which made men—and women, too—ask for more and more paper as they wrote, as they read, as they used all forms of it in their business.

New industries, forsooth, sprang from the ground, practically, as paper blazed the trails. In 700 years the progress was slow, almost stationary, until the Fourdrinier showed everyone how to make more paper, use more paper. Never in the imagings of man could the hand production of paper have been sufficient to meet even the small demands of the then present times. Hand production was limited to almost a local distribution, notwithstanding the export and import of paper. But, with the Fourdrinier, and all the accompanying improvements and devices brought forth by this development, local demands became universal.

And, strange thing, even back to the original Orient went machine made paper, back to China, for example, where paper was born. Today, as we buy and use paper for almost everything we do, we give little thought, indeed, to its sources, to its technical supply. We merely take it for granted that paper shall be available. That it shall be available, also, at a price that shall be reasonable, even cheap.

So, after 700 years, we are stepping still to new things in paper. From 1850 on the progress of paper was even more remarkable than all those seven centuries brought forth in this product of human necessity. In the following hundred years, almost, and to this date, development of the paper industry is more American than foreign. It is truly a story of the United States, plus the valued contributions of the several parts of the world making the ingredients, from pulp to even the finished product.

Drying End of the Great Paper Machine



(Courtesy, The Byron Weston Company)

THE CASE OF THE Paper-Makers of *Great Britain.*

THE Making of *Paper*, in that part of *Great Britain* called *England*, is of late years come to great Perfection, and daily improving, and now employs ſeveral Thouſands of Poor Families; but by the many and great Hardſhips that at preſent the Makers lie under, and the Apprehenſions of greater, that are likely to come upon them by the intended *Tax on Paper*, gives them juſt Grounds to fear they ſhall be obliged to lay down ſo uſeful a Manufactory, to the Total Ruine of ſome Thouſands of Families employed therein.

Some of which HARDSHIPS are as follow, *viz.*

I. That *Cards* having laſt Year ſo great a Duty laid on them, that not above one Twentieth part has been made this year of what us'd to be; to the great Detriment and Diſcouragement of the *Engliſh* Manufacturers of *Paper*.

II. That the laſt Year a Duty being laid upon *Almanacks*, has been another great Loſs and Impoveriſhment to the ſaid Manufactory.

III. *Mill-Boards*, which are made in this Kingdom, and alſo imported from *Holland* in great quantities, and uſed to the ſame purpoſes as *Paſt-boards* made of *Paper*, have for ſeveral years hindred the Conſumption of at leaſt 30,000 Rheams of *Paper* yearly; and if this intended Duty be laid upon *Paper*, excluſive of the ſaid *Mill-Boards*, the Conſumption of *Paper*, uſed in making *Paſtboards*, muſt gradually decreaſe, by reaſon of the Cheapneſs of the ſaid *Mill-boards* (they being exempted from the Duty) until at length no *Paper*, ſubject to the Duty, ſhall be uſed for *Paſt-boards* as formerly, which will not only tend to compleat the Paper-makers [illegible] but to the Detriment of Her Majeſty's Revenue by this intended Duty, at the leaſt 60 or 70000 Rheams of Paper yearly, which would otherwiſe be uſed in the *Paſtboard* Trade.

IV. By *Scale-boards*, imported in great quantities at a very ſmall Duty, which are wrought up into *Band-boxes*, which were formerly made of *Paſt-boards* made of *Coarſe Paper*; which Manufactory is now entirely loſt, to the great Prejudice of the *Paper-makers* and *Paſtboard-makers*, and which hinders the Conſumption of very great quantities of *Paper*, and by conſequence muſt alſo be a further very great Detriment to the Revenue intended to be raiſed by this Duty.

It is hoped a *Draw*-back will be allow'd for ſuch *Britiſh* manufactured *Paper*, as ſhall be exported to Foreign Parts.

We humbly crave leave to repreſent to the *Commons of Great Britain*, the great Hardſhips we are like to lie under, by ſo great a Charge on ſome particular ſorts of *Paper* mentioned in the Votes of the 24*th* of *March* laſt; *viz.* on the ordinary *Demies*, ordinary *Crown*, ordinary *Fools Cap*, ordinary *Pott*, and on ſmall ordinary *Brown*; wherein the leaſt Duty voted is 25 *per Cent*, but moſt of it 30 *per Cent. ad valorem*, according to what we the Makers, *bona fide*, ſell them for to the *Stationers*. As for inſtance,

Demies Ordinary, ——	Duty intended 1 *l. per* R.	—— Sold at	3*l.* 4*s.*	30 *l. per Cent.*
Crown Ordinary, ——	Duty intended 9 *d. per* R.	—— Sold at	2 6	
Fool's Cap Ordinary, —	Duty intended 9 *d. per* R.	—— Sold at	2 6	
Ordinary Pott, ——	Duty intended 6 *d. per* R.	—— Sold at	2 0	25 *l. per Cent.*
Small ordinary Brown, —	Duty intended 4 *d. per* R.	—— Sold at	1 6	

And having found, by ſad Experience when a Duty was before laid on *Paper*, about 14 years ago, that we were not able to get one peny advance upon our Goods, we fear we ſhall now lie under the ſame Hardſhip, and that, by laying ſo high a Duty on our Manufactories, we ſhall be forced to loſe the Benefit of all our Arts and Endeavours therein, after ſo many years Labour and Induſtry, and at ſuch vaſt Coſts and Charge, when we have arrived to equal Knowledge with Foreigners, in that Trade.

It is true Foreigners have the advantage of Materials; but we hope the Legiſlative Power will compenſate that by increaſing the Duty on *Foreign Paper* and *Scale-Boards*, and lowering the Duty of our *Home Manufactured Paper*; that ſo Uſeful a Manufactory may not be loſt to the Nation, and Thouſands of People lie ſtarving for want of Employ.

All which is humbly ſubmitted to the Conſideration of this Honourable Houſe, to commiſerate the threatning Evil to the Paper-makers of Great Britain, *that ſo Beneficial a Manufactory may not be loſt to the Nation, and ſo many Perſons employ'd therein totally ruin'd.*

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

A Broadside of the Seventeenth Century, Advocating A Duty on Paper

CHAPTER XVIII

Machines Constantly Improved To Make More Paper

UP to the year 1850 there was still that recurrent scarcity of paper that defied all attempts to conquer it. Fourdrinier machines had made more and more paper, but the consumer demand was still for more and more paper. Not only were newspapers demanding more of their product, newsprint, but the era of industrial development in many countries, and especially in the United States, was creating consequent demands for all sorts of by products of paper and its production. With the apparent development of newsprint from the then new wood pulpers, newspapers of the world would be assured a more or less steady supply of paper, not from rags or other substitutes, but from the very trees of the limitless forests.

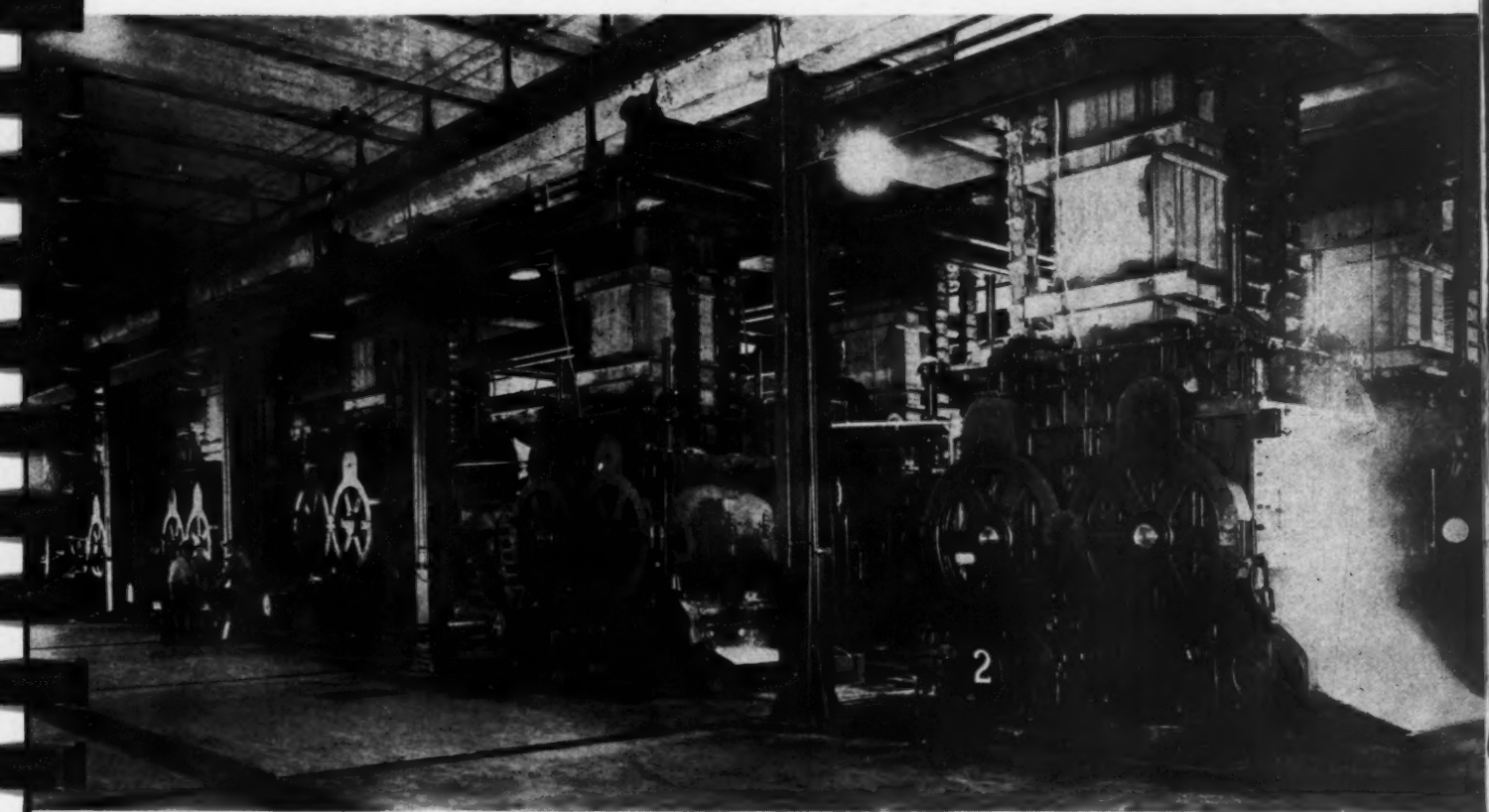
Yet, with all, the scarcity of paper continued. Machines and men were doing their very best to meet the demands. Improvements in all forms of machinery and equipment, as we have seen over the previous years, permitted the industry to gear itself for greater endeavor. But the supply was still insufficent to meet the daily and annual demands.

All interests in the newspaper field turned toward the German wood grinders. Yet the American participation in this development was cautious. If American wood pulp was to come in quantity, new methods must be found for its production.

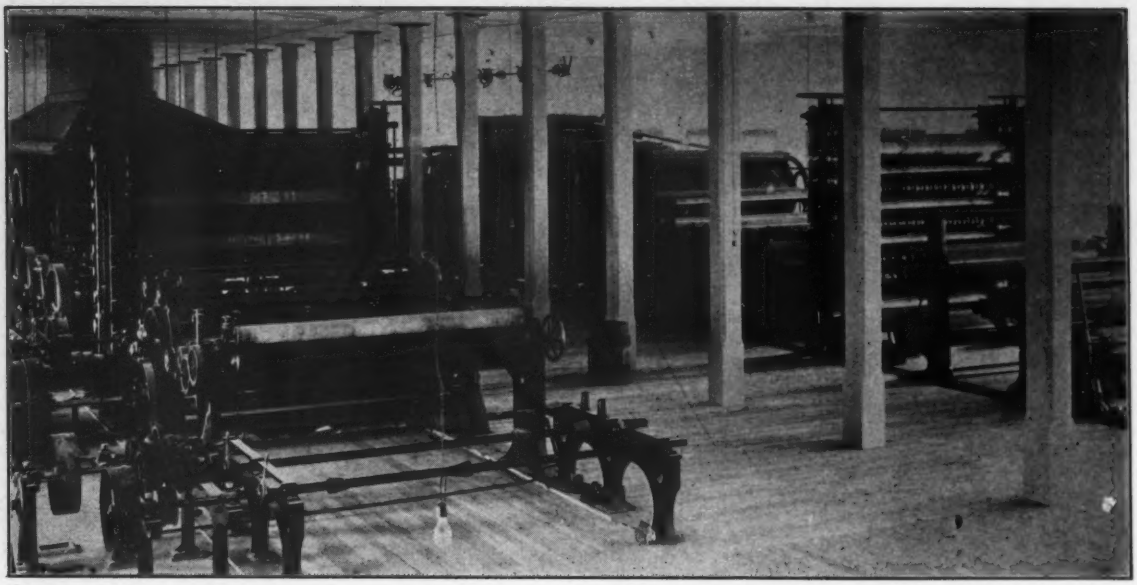
American forests were almost limitless, at the time. And farsighted men even looked to the north, to Canada. Nothing of practical importance was accomplished along this line, however. That was partly because the industry was still engrossed in rags, in numerous other materials which were insufficent, impractical. Wood pulp was the answer, but the country was not prepared to accept it.

In 1851 there was pulp wood paper shipped in quantity from the mills of H. Voelter Sons, in Heindenheim and in Silesia, too. About 1,200 to 1,500 newspapers an hour were now being turned out by plants

Even Numbers on this Side of the Batteries in the Mill



(Courtesy, International Paper Company)



(Courtesy, Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin)

Some of the Old Paper Making Machines of the Nekoosa-Edwards Paper Company in the Days of John Edwards, in 1887

in the United States. This was thought to be a record in this swing of the century.

In the kingdom of the Two Sicilies there were 12 paper machines now in operation. This was just an off-side fact of the industry in a land where hand paper production had originally thrived in the early days of the trade in Europe. Donkin had shipped 14 of his famous paper machines to Italy and to southern Europe; 83 were used in Great Britain; 23 in France; 46 in Germany; 22 in northern Europe; 1 in India.

Brewer & Smith, still active in England, had perfected better paper moulds in 1851. These were also patented in the United States that year. Six machines were then operating in Denmark. There was also one in Holstein. Seven machines were producing paper in Sweden. Seventeen machines were used in Spain, another pioneer in hand made paper, but slow to accept the machine. Spain bought its machines in England, France, and in Belgium. Sardinia had twelve machines. Two English machines were used at Florence, Italy. Switzerland had twenty-six, which wasn't bad for such a small country. Six more machines were used in the combined Lombardy-Venetian kingdom. Three additional machines were in the Roman States. Smyrna had one machine, and that was strange, as Mohamedan Turkey had been active in hand made paper, centuries previously.

George West, at Tyringham, Massachusetts, once more, came to the front with an improved pulp strainer. This was in 1851, too, and the strainer was operated by a bellows. In the following year, 1852, Great Britain had 1,616 beating engines. G. W. Turner, that year, bettered the paper machine in England by an endless wire webbing passing around the cylinder. This took the pulp right out of the vat to the dandy roller and a pneumatic trough, eliminating the fixed wire web and the endless felt, in the cylinder machine, and the wire web in the Fourdrinier. And the pulp also passed through a tub of sizing, between two endless felts, producing greater uniformity and saturation of the pulp.

In 1853 two more than ordinary facts presented themselves: First, the old paper mill at Chester Creek, in Pennsylvania, which was established 'way back in colonial days, about 1713, was still making paper by hand. Benjamin Franklin used to get his paper there. For a hundred and forty years it had continued to make hand made paper, finally ignoring the advent of the paper machine. Second, the first Fourdrinier machine was shipped west of the Mississippi. It went to the Pacific. Samuel B. Taylor ordered it for his Taylorsville, California, mill. And, of course, it was built by Smith & Winchester, of South Windham, Connecticut, the pioneer American paper machine firm. With two men this famed machine was shipped by boat to Panama. There the parts were most carefully unloaded and skidded across the isthmus. But they had to wait there for some months before they could obtain a ship sailing (sailing is the word, not steaming) for California. Lots of ships might have taken the cargo of paper machine parts, but the freight charges were outrageous. Besides, everyone was going on to the great California gold rush. Finally, the machinery went to Bolinas by boat, thence by ox sled over the mountains to the mill.

At Aberdeen, Scotland, Brown & McIntosh invented hollow moulds in 1853. They were made of perforated metal or wire, covered with felt. Inside, a vacuum was created as they were immersed in pulp, thus causing the material to adhere more closely to the felt as it was moved to the uniformity of the completed paper.

This same year of 1853, too, saw a great shortage of newsprint in the United States. Publishers had to decrease the size of their papers, as the price advanced 2½c per pound. Papers like the New York Sun were selling on the streets for one cent, so had to cut their size. This condition continued, off and on, to the outbreak of the Civil War, when they went up, of course, with a war whoop.

In England, in 1853, a German patented a machine to make paper from wood, once more. Fir, pine, and willow trees were used. Demand for newsprint caused many inventors to search for new processing. But all forms of paper were selling well. In the United States more paper was now being manufactured than in all England and France, combined. Some 200,000 tons annually were produced here now.

Nolan & Antisel patented another paper machine in 1854. Cost of paper induced these, and may other clever men, to look for quicker and cheaper ways to make the product. Richmond & Cushman, of Amherst, Massachusetts, made a device to dry thick paper. They used heated platforms, or tables, and permitted the pulp to remain thereon until warped, when weights were lowered to flatten the sheets. E. L. Perkins, of Roxbury, Massachusettes, perfected a method of polishing paper to a high degree. Woodward & Bartlett, of Massachusetts, patented a new rag cutter.

In the following year, 1855, Henry Fourdrinier died. He was the sole surviving partner of the famous English paper machine firm, aged 90. He had spent every cent he had in perfecting the original machine, and he died very poor.

Horace W. Peaslee, of Malden Bridge, New York, made a new machine to wash rags in 1855. American mills were becoming very prosperous at this time. And in England, also in Ireland, where paper was still very scarce, the peculiar fact was that only 380 mills were operating. This was less than half of the total twenty years previously. Explanation seemed to be that steam and modern processing were cutting sharply into the gross number of mills, but that the actual paper production was rising with those mills remaining. This was proven by the amount of stock required to operate the vats. Rags used in Great Britain had risen to 201,600,000 pounds, or more than 100% in the same time.

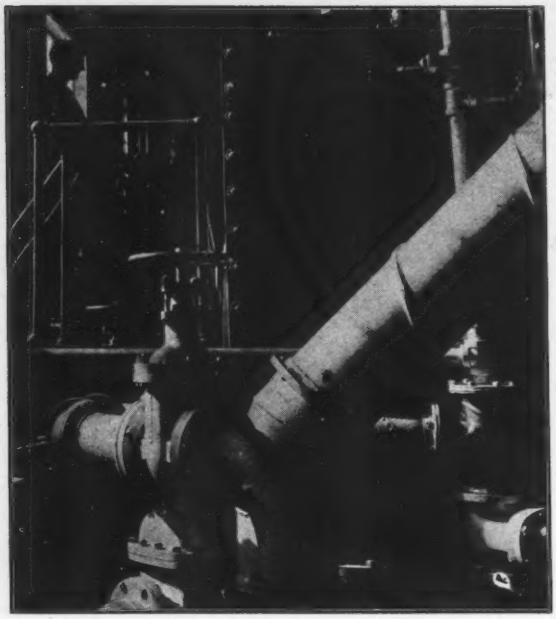
At a wall paper mill on the Kayaderosseros, near Ballston Spa, New York, in 1855, an investment of $85,000 was required to equip with modern engines and other machines. Yet the investment appeared to be lost. Production stopped almost before it got going, as the plant was built in 1854. At Woodville, Jefferson County, New York, the mill of C. & O. Clark was destroyed by fire that year of 1855, as so many American mills were, also. Four engines were used, and rebuilt, and used a 62 inch paper machine the following year, 1856.

Pacific Mills, at Windsor Locks, Connecticut, were believed to be, that year, the largest paper plants in the world. This area was a tremendous paper section, with mills competing for the total tonnage of many great enterprises of the time. To give an idea of the total of the newsprint consumed in the United States in 1856, it was said that the annual rate was equal, in New York City, alone, to 6,000 wagon loads of two tons each, considered a prodigious amount.

Peaslee again came along with a new drying cylinder. It was a spiral tubular heater, based upon a nonconducting cylinder. P. H. Wait, of Sandy Hill, New York, patented a new felt guide. Vespasian O. Balcom, of Bedford, Massachusetts, evolved a stock grinder. This was a revolving pulp tub with a grooved grinding roller at a speed varying with that of the tub itself. Joseph Kingsland, Jr., of Franklin, New Jersey, also put out a hydraulic pressure grinder. Feeding of stock was independent of the grinding. Lee, Massachu-

Eight Modern Paper Making Machines Now Turn Out the Business and Printing Papers of the Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin

(Courtesy, Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin)



(Courtesy, Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin)

Processing the Paper

Today, We Have Technical Wood Grinding for the Mill, Via Chipping, Cooking, Bleaching, Washing, Processing the Paper

setts, that year, was famous for its low cost writing paper. It had 75 engines in its mills.

Stock for the mills was becoming so scarce that various newspapers mentioned that their runs of newsprint were from the strippings of cloth from Egyptian mummies. In fact, one mill owner said that, in his endless quest for stock, and the fact that whole shipload of mummies were coming over to America for waste mills, his only difficulty in export from Egypt was with the Near East railroads. They objected to the removal of the mummies because they preferred to burn them in their engines.

In the year 1857 Edward B. Bingham, of Brooklyn, New York, (then a separate city from New York), made an improved cylinder machine. This was an endless apron. It was placed at each end of the cylinder, with a traversing motion to that of the cylinder. This apron method then laid the pulp on the cross-lap method, making stronger paper. J. S. Blake, of Claremont New Hampshire, derived a new way of trimming the edges of paper pulp, also preventing creasing of the paper on the felt. This prevented considerable waste.

Patrick Clark, in Rahway, New Jersey discovered a method of cleaning felts and cylinders with the water separated from the pulp. He so saved a large water waste item in 1857.

In 1857, L. C. Stuart developed a new drier for sized paper. He passed it over a series of oblong cylinders, also between them, and their surfaces were perforated with small holes. Through these holes graduated heated air was forced. This warm air escaped, coming into immediate contact with both sides of the paper as it left the sizing vat. Vapor escaped, also, as the paper was exposed to the air. All this was known in the United States, but, seemingly, was new to England, where the patent was taken out.

Crompton, the English mill man and many sided inventor, died in England in 1858. He was 66. He had invented the continuous drying machine attachments, and was quite well-to-do at death. One of the few paper machine inventors, perhaps, who lived and died with money.

Stephen Rossman, of Stuyvesant, New York, made a lifting roll in 1858 to prevent breakage and tearing of paper, as it passed from the upper of the second press rollers to the driers. Web of paper was merely passed between the two rolls, as the cohesion of the web to the roll eases off. J. & R. McMurray, in New York, perfected a rigid frame to make sure of a perfect cylindrical wire cloth surface for the paper machine, also available for other industrial machines.

S. S. Mills, in Charleston, South Carolina, managed to make a machine to separate fibre from pulp in hemp. This was done in 1858 with a shredding cylinder, a heckler, and a scutching cylinder.

In that year, too, the famous Housatonic paper mill of Platner & Smith, at Lee, Massachusetts, burned, with a loss of $150,000. Only $30,000 of this was insured, and much valuable machinery was lost. It was probably one of the largest mills in New England, with the very latest in equipment. In this year, too, the newsprint mill of the New York Tribune was destroyed by fire, with a loss of $100,000 at Bath Island, Niagara Falls, New York.

Thomas Lindsay, of Westville, and William Geddes, of Seymour, Connecticut, made a device to vary the width of paper while the machine was in motion, in 1858. This called for the lip or basin, conducting pulp from the endless wire apron to be made in two parts. One part slid over the other, connected with the deckles, adjusted to a lateral movement.

Issac N. Crehore and Francis Stiles patented a lead plate in 1858 to work with sheet metal knives, corrugated, formed with a series of angles, or curved lines, for the rag engine. Lead plates broke easily, and were hard to repair. In the following year, 1859, Morris L. Keep, of Rogers Ford, Pennsylvania, made a boiler improvement by use of an expansion chamber, stirrers, and discharge valve for the use of wood pulp. Martin Nixon, too, in Philadelphia, made a boiler gain by an upward current of steam, plus a downward current of hot alkaline solution, and making provision for inversion of the boiler to discharge the cooling contents.

Crocker & Marshall, of Lawrence, Massachusetts, in 1859 perfected a combination of internally heated drying cylinders. They were made with a steam box to first dry the paper, then moisten it, prior to calendaring the stock. Rolls also calendared the paper by pressure.

In the next year, 1860, as the Civil War simmered, there were 555 mills in this country. Jordan & Ken-

nedy, this year, with permission of Grant, Warren & Company, claimed a reissue of patent papers for grinding and sizing pulp. This was a conical grinder, and outer shell, with adequate pipes for flow of rags and sizing. Massachusetts, that year, made 58% of all the paper that had been used in the United States in 1850. Edward L. Perkins demanded a patent reissue for drying paper. He had a machine which could also be used by other industries.

Paper mill fires appeared to persist that year of 1860. There were more than a dozen large losses, totaling $100,000 or more. Census report of the Government of the United States, that year, totaled over II millions of dollars in production of papers, books, and so on in New York City alone. This was the largest industrial investment in the city, at the time.

Joseph Storm, of Woonsocket, Rhode Island, perfected a new rag engine in 1860. That year, also, the first machinery to be shipped to Minnesota arrived on the mill site at the Falls of St. Anthony. Machinery was used in Boston, Massachusetts, that year to make an unprecedented number of paper collars. Over a half million collars were so made there that year. C. S. Buchaman, of Ballston Spa, New York, made a new pulp boiler in 1860. It was a rotary, with combined cylindrical strainer.

As the Civil War broke out many paper makers were called to the colors in 1861. Yet business was not good. Glut of the market, in fine writing paper, caused a meeting of the mill owners in Pittsfield, Massachusetts, in 1861. They proposed to cut production one-third. But the war, then on, was to change all that over night. They would, indeed, and they did, have difficulty meeting the demand, a few months hence.

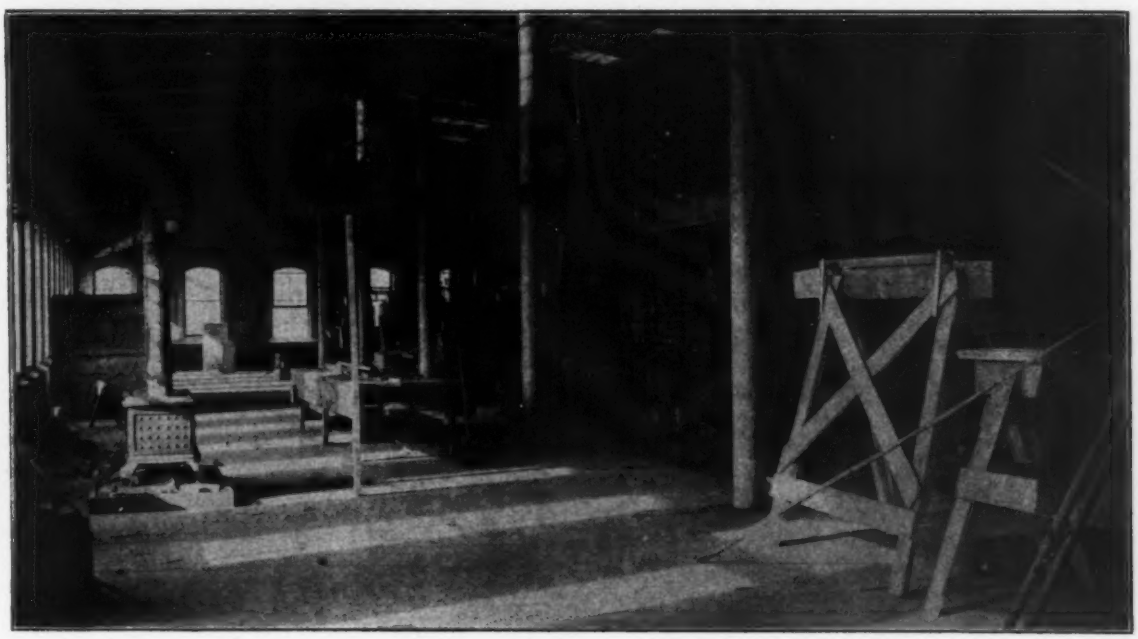
Joseph Jordan, of East Hartford, Connecticut, in 1861, made an improvement to machine grinders by a arrangement of the knives. Gelston Sanford, in New York, also made an improvement to grinders. He made conical shaped staves, with rough surfaces, alternately in reverse, with serrated rubber.

Southern newspapers were now having a difficult time obtaining sufficient paper to print their editions. In the case of the Macon, Georgia, Telegraph, the newsprint had to be brought from Belgium. War of the States, now in full swing, certainly upset the apple cart of many newspapers. And not only in the south, but in the north, too, as all paper supplies became difficult to get, more expensive.

Cylinder machines were making most of the newsprint for this country, but Fourdriniers did it better. Expense of Fourdriniers caused a more cautious attitude in their acquistion by mill operators. Also, Fourdriniers, of that day and date, required more skillful mechanics, then scarce, owing to the war. Wires and felts, previously largely imported, now came from American mills, as foreign supplies were reduced, or cut off by the war and by more costly supplies.

Two Englishmen, Hugh Burgess and Charles Watt, who had arrived hereseven years previously, were now making wood pulp paper at Manayunk, Pennsylvania. Chemical wood pulp was also coming along. Sulphite processing was used in making paper also at Manayunk. Fully 88% of all the paper used in this country was then being pulped from rags. But cotton, from the south, was impossible, owing to the war. So the Paper Manufacturers Association was founded in 1862 at the Astor House, New York, to meet these and other problems.

Grinding Wood into Pulp Was a Crude Affair in 1887



(Courtesy, Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin)

(Courtesy, Keith Paper Company)

Washing the Macerated Rags

A. Randel, of New York City, in 1861, had made a new device for pulping. This was a new combination of crushing rollers with the shredding cylinder.

In 1862, James Harper made a superior handling attachment to the Fourdrinier at East Haven, Connecticut. He combined, with the Fourdrinier wire cloth apron, a couching belt, to couch the pulp from the wire cloth direct to the perforated cylinder, so to the beater.

In Springfield, Massachusetts, the paper mill people met that year to raise prices. Writing paper manufacturers were represented, and effected the increase of war demand paper from 13c and 14c the pound to 17c for flat cap, 15c to 25c for letter and note paper.

N. W. Taylor and J. W. Brightman, of Cleveland, Ohio, managed to make a decided improvement in drying machines for sized paper. S. S. Crocker, of Lawrence, Massachusetts, that same year, 1862, made a combination of small and large receptacles, for cleaning pulp into a machine, that worked together. Niagara Falls Paper Mill Company made 2,000 sheet reels by an improvement in feeding cylinder presses. In this way the paper was fed, cut, and printed, in one operation, saving the labor of eight men. In the Fall of that year, 1862, paper prices hit 17c per pound for ordinary newsprint, formerly 8c, net cash. Writing paper jumped to 40c, first class printing paper, 30c. Also, the first paper twine appeared that year, due to the shortage of cotton from the embattled south.

In 1863, John F. Schuyler, of Philadelphia, Pennsylvania, made new machines for polishing paper. John F. Jones, of Rochester, New York, improved cylinder moulds. He made hollow journals, to carry away the water, eliminating vat packing inside, substituting outside packing, easier to handle, reducing waste. Jonahhan Faew, of Lockland, Ohio, took out a patent for the improvement to the rag engine. Henry Watson made an improvement to the pulp strainer at Newcastle-on-Tyne, in England, with the aid of Joseph Millbourn, of Dartford, also in England.

John Cowper, of England, that same year, 1863, made a decided improvement in reducing rags and waste with an endless feeder. This material was now between a pair of fluted rollers, delivered to a rotating cylinder, with teeth. Jones, again, in Rochester, bettered his machine to make paper and paper boards. He rearranged the set-up, thus enabling a machine to make any number of continuous webs. These could then be woven into each other, or separate, as desired. He claimed seven new points.

In Boston, Massachusetts, the Weekly Journal appeared, January 15, 1863, printed on probably the first wood pulp paper, made in a Maine mill. In the south, Civil War conditions compelled the newspapers to reduce sizes, cut pages, some now of the size and shape of mere hand bills, printed in 6 point on both sides. Some southern newspapers used ordinary wrapping paper, colonial style, some used paper bags—when they could get them—to print war extras. And some other southern papers came out on wall paper. That form of decoration (sic) was used by the Vicksburg Daily Citizen, in Mississippi, almost at the time of Grant's seige. Some newspapers in the south charged $72 a year for a subscription.

Money was printed on the back of lottery tickets (in Louisiana.) Finally, as the war brought even tougher conditions to the newspapers, $96 and $120 were

(Courtesy, Keith Paper Company)

Sorting the Clean, White Rags

charged for subscriptions. For ink, sometimes shoe polish was used, or, as the English said, "boot ink." Penny newspapers in the north disappeared, or, at least, prices on the street went to four and five cents the copy. Sunday newspapers appeared for the first time, as readers demanded quicker war news, with the incomplete lists of casualties from which almost every family suffered.

War, as it invariably does, brought upon the country vast numbers of new items, as substitutes in paper for other articles of merchandise. Paper plates, even vests (then waistcoats), petticoats (and did the hoop-skirted women need them!), tapestry, curtains, carpets of paper all appeared—and were promptly sold. And, along came the important item of building—roofing and building papers for insulation, although, at that time, they were not so described. Boxes, pails, cuspidors of paper, appeared on the market. Even barrels of paper were made and sold.

And new machines had to be made to make the numerous items of commerce that were made so necessary by war. Patterns for dresses also appeared for the first time in paper. Some women had always used newspaper home-made patterns, but now the famous house of Butterick developed the dress pattern. Ebenezer Butterick started in the small town of Sterling, Massachusetts, and soon developed a paper pattern business of attention.

New mills opened, with new machinery—when they could get it. Newsprint hit 28c the pound; book paper 45c; writing paper 60c. From Canada came the first wood pulp newsprint. This was made by Angus Logan & Company for 25c the pound. By 1864 the country was, indeed, machine and paper minded. It heard the constant whir of busy machines, night and day. It had to have paper, and the modern machines of that day were trying to make it—in what was then believed to be quantity.

Meantime, in 1863, the boiler was again improved by M. L. Keen, of Rogers Ford, Pennsylvania. In England, William Boaler made a new dryer fabric at Manchester. He said it was an improvement on prevailing methods, and maybe it was. In the next year, 1864, George A. Corser, of Leicester, Massachusetts, made an angular bed plate for pulp engines. W. F. Ladd, of Tarrytown, New York, perfected a boiler to press

So Go the Debarked Logs of Pulpwood into the Chipping Machines

(Courtesy, International Paper Company)

(Courtesy, Keith Paper Company)

'Round, and 'Round and 'Round Goes the Pulp in the Vat

vegetable pulp. He had the assistance of S. A. Walsh, of New York City. Four dollars a cord was being paid for pulp wood. The Wood Pulp Works Company was founded in 1865 at the old paper town of Manayunk, Pennsylvania. It had the marvelous capacity of 300 hundred weight of pulp daily. They used the chemical processing of Waitt & Burgess.

William Bullock made a rotary printing machine, printing a newspaper on both sides at the same time. This was considered marvelous. It printed 10,000 copies hourly. But they were unfolded then. This exceptional machine was first used by the progressive New York Sun. Luther C. Cromwell made the first paper bag machine. Christopher L. Sholes made the first typewriter in 1867, but it wasn't really marketed until 1874, a very crude contraption.

All this made the paper business hum. So much so that, for example, in 1866, the Carew Paper Company, of South Hadley, Massachusetts, paid a dividend of 100%. And in addition, they had enough left over to build a new mill! In 1865, though, they had paid 120%! American paper prices were so high that the famous publishing firm of Harper & Brothers imported its paper from Belgium; Ticknor & Fields, also famous at the time, brought their paper from London.

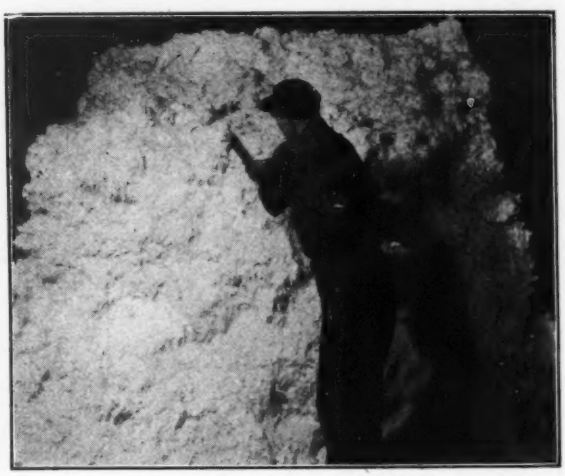
In 1867, L. Murray Crane, in Saratoga County, New York, invented a paper to prevent counterfeiting. He was the first to run minute threads of rubber through the sheet, method later used with silk by the United States Treasury to make paper money bills at his mill for years and years.

It was now evident, in 1867, that the bottom was falling out of the war demands. In other words, the paper business of the country, like everything else, was endeavoring to get back to normal, or thereabout. There had been, during the war years, a gain of approximately 50% in mills. Previously to 1861, the mills had been running, even then, night and day, to catch up with orders. But now the mill owners met and decided to apportion the trade by operating on reduced mill schedlues. Paper prices were descending. As the year closed the newsprint, for example, went down from around 25c to 16c the pound.

Europe, too, had seen increases in production. France had been particularly busy. But, in 1867, there were still 140 firms operating on the old fashioned hand production pasis. In the United States some southern mills were being slowly rebuilt, after the ravages of the armies in the Civil War. They required new machinery also. Mills at Marietta, Georgia, were now reconstructed. They got into gear with some limited local business. In the north, straw was still being used for newsprint. Wood pulp came along very, very slowly, indeed. Production in the United States, of all types of paper, now reached the then huge sum of 440 million pounds per annum, more than that of England and France, combined.

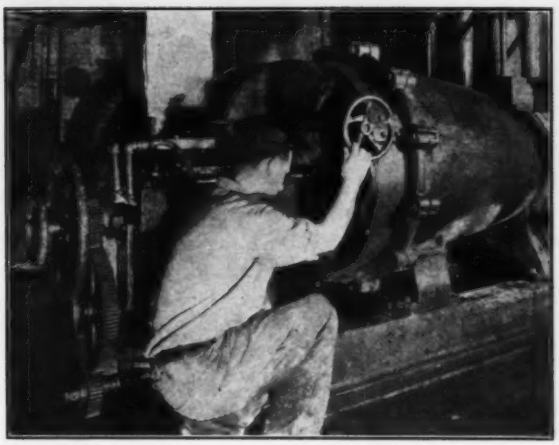
Mills at Holyoke, Massachusetts, in 1868, were making writing paper in fair quantity. Some paper collars, tissue, and other odd papers were also made. There were ten mills there, using more or less modern machinery. Lee, in the same State, also an old paper town, had twenty-one paper mills that year. Fourteen additional mills operated in that same county of Berkshire, in the famed scenic Shaker mountains of that area, supplied by bountiful clear water in swiftly running streams. One mill was making machine paper belting, as a substitute for leather belts. Sheathing paper was made at Needham, in the same State, at the Waban mills.

A great flow of paper patents now came to Washington. Ground wood pulp came into gradual use. Mill of Albrecht Pagenstecher, at Curtisville, now called Interlaken, Massachusetts, home of the Stockbridge Indians, had two wood pulp machines. They used the famed and original German Keller-Voelter patented



(Courtesy, Keith Paper Company)

Draining the Pulp



(Courtesy, Keith Paper Company)

Jordan Pulp Engines

processing. Pagenstecher brought the plans over from Germany in 1866 through a relative. Wood pulpers were imported, even the supervising workman. Only one-half ton was the daily capacity of the mill. This was immediately sold to the Smith Paper Company, at Lee, Massachusetts, for the reduced price of 8c the pound. Pagenstecher did not have paper machines, and the Smith folk did. Pagenstecher started another mill at Luzerne, New York. But that wood pulp machinery was made in the United States. Warner Miller, the paper manufacturer, could see the advantage of the new wood pulp, if the entire newsprint trade could not. Years later, this mill became the Hudson River Pulp & Paper Company.

Wood pulp, then, was pressed into blocks. In the form of "cheese cakes" it was sold to the processing mills. Miller, however, finally devised a cylinder machine to press more water from the wood block pulp. This method ran the blocks into sheets, reducing costs.

Another mill man, Benjamin F. Barker, nearby the Interlaken mill of Pagenstecher, took out four patents to cover wood grinders he had designed himself. In 1875 they were almost automatic, Barker claimed. In New York, the first paper to use this new newsprint was the old German language paper, New Yorker Staats-Zeitung. Next, the New York World took it up.

Sulphite was another new thing, at the time, as chemists all over Europe were experimenting with the process. In this country, too, chemists and mill men were busily engaged with the work. Benjamin Tilghman had used the first process in Pennsylvania, but losing his money, gave up in disgust. Thereafter, in quick succession, George Fry and C. B. Eckman, in Sweden, again occupied themselves with the idea. Also, Alexander Mitscherlich, a professor, experimented with a German method. Moritz Behrend, of Coeslin, likewise adopted it. Many of these men had patented their processes. So the usual legal encounters occured.

It was not until 1882 that Charles S. Wheelwright unsuccessfully made sulphite wood pulp at his Providence, Rhode Island, mill. In 1887, the actual commercial production of wood sulphite began. Two lumbermen, G. N. Fletcher and Albert Peck, used waste from the Penisular lumber mills. So they placed their new sulphite mill at Alpena, Michigan. And it was not until 1898 that E. R. Behrend and Dr. Otto F. Behrend, sons of Mortiz, made the finished wood pulp with sulphite at Erie, Pennsylvania.

But imported pulp, from wood sulphite, was, meanwhile, being imported here. This accured in the early '90's. Also, over the decade, business in all sorts of paper, like everything else, had been up and it had been down. In the early 1870's, the country passed through that rinsing out process which occurs after every war, and, particularly, after seven good business years. About this time, mills were trying to save money, rather than to spend it. American Wood Paper Company, at Manayunk, Pennsylvania, in 1870, found a way to save 85% in waste alkali. Used liquor was conducted from the pulp boiler to a reservoir, so to evaporating furnaces.

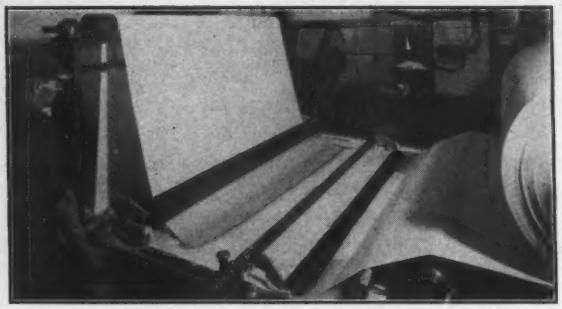
Manufacture of paper collars in the Boston, Massachusetts, area had reached a total production of 75 millions annually in 1870. Fine book paper was then selling at 20c to 24c the pound; ordinary book at 16c to 17c. Newsprint, largely straw paper, was 12c to 12½c the pound. Insulated strawboard, prepared with tar, was used in 1871 for building. It was made by the Rock River Paper Company.

Fourdrinier machines had now (1870) attained a speed of 175 feet per minute, making 25 tons of paper weekly. Previously, the Fourdrinier had made 60 to 80 feet in the same time for ordinary printing paper. Fires still took a great slice of the mills and of the profits from the paper industry. Losses were infrequently covered with sufficent insurance. Machinery and equipment were usually a total loss.

In 1871, paper car wheels were being manufactured. They had steel tires, operating about 100,000 miles, vs

(Courtesy, Keith Paper Company)

Washing and Bleaching the Pulp



(Courtesy, Keith Paper Company)

Tub Sizing the Paper

steel wheels with a record of approximately 60,000 miles. Manila paper manufacturers met at Sandy Hill, New York, in that year, trying to maintain prices.

To get at official figures (then hardly available in 1872), the new first issue of the LOCKWOOD DIRECTORY set the number of United States mills at 812. Their total value was $35,564,700. They had annual production of $66,500,000, employing 22,000 people. This was the first really accurate estimate of the industry.

Newsprint was now being made (1872) in Nova Scotia. Bedford was the site of the first apparent mill there. World production of paper, in 1873, a year later, was 1,060,000 tons. About a third of this total, or 317,387 tons, was then made in the United States. Germany was credited with 180,000 tons; Great Britain about the same; France, 148,000 tons. Machinery accounted for most all of this, except a trifle from France, which was still hand made.

In 1872, more than a million dollars were lost in the United States from paper mill fires. Many of these, it was claimed, were started by machine friction. Of course, there were no cigarettes, to mention, at the time, so the firemen had to say something.

In 1873, there was a boom in mill construction. Forty-two mills were under way in August. Much new machinery was required, and on order. In England, William Chadwick & Son, of Pendleton, were making paper 113 inches wide on a 120 inch machine. In America, the widest paper machine was only 96 inches. There was evidently opportunity, here, for improvement.

It was estimated, in 1874, that three-fourths of all the paper made in the United States came from the State of Massachusetts. Small boats were being made of paper in this year. One such plant was at Troy, New York. E. Waters & Son made them, constructed of molded linen paper, one-sixth inch thick.

Business had fallen off sharply in 1875. Entire country was in semi-panic. There were many new mills in operation. A grand total of 895 covered all plants in the paper industry of this nation. Some 773 firms owned these mills. Nine new mills were still being built, but the trade doubted the advisability of completion, at the time. Machinery, too, took a drop. No one wanted to buy new equipment.

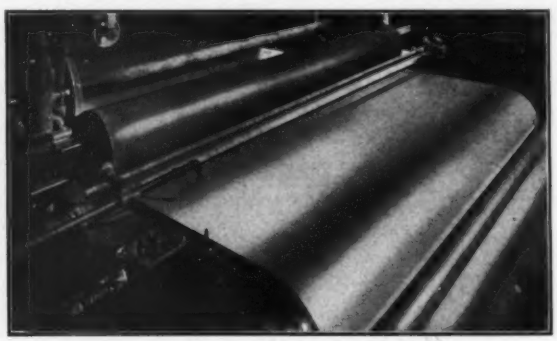
Still, by 1877, there were 934 mills in the United States, with 795 operators. In the east there were 254 firms, 327 mills. In the middle States there were 328 firms, 360 mills. In the west, 155 firms, 179 mills. In the south, only 58 firms, with 68 mills, as the southern development had not yet been repaired, fully, from the effects of the Civil War.

Corrugated packing paper was first offered at this time. Crowell, still working on his paper bag machines, invented another which now made commercial square bottomed bags. Greeting cards, finding their gradual way across the ocean, were now made for Christmas by Louis Prang, a Boston, Massachusetts, artist. He sent his designs to England, and back they came as an English idea. Photo engraving came along, developed from line cuts as an offering from Paris. Charles Gage now made paper, coated on both sides, at Springfield, Massachusetts. At Breslau, Germany, a factory chimney fifty feet high, was made all of paper.

At the Troy, New York, Rensselaer Polytechnic Institute, oldest American technical school, a dome was made of paper for the observatory. Firm that built it, Elisha Waters & Son, at Lansingburg, New York (now part of Troy), also made a dome in three dozen sections for the West Point, New York, military observatory, (not now used) using 2,500 pounds of paper. All these things took new and especial sorts of equipment. Minds of men were busy with paper. They devised much that was then new, now of ordinary daily use, some plans that were soon discarded.

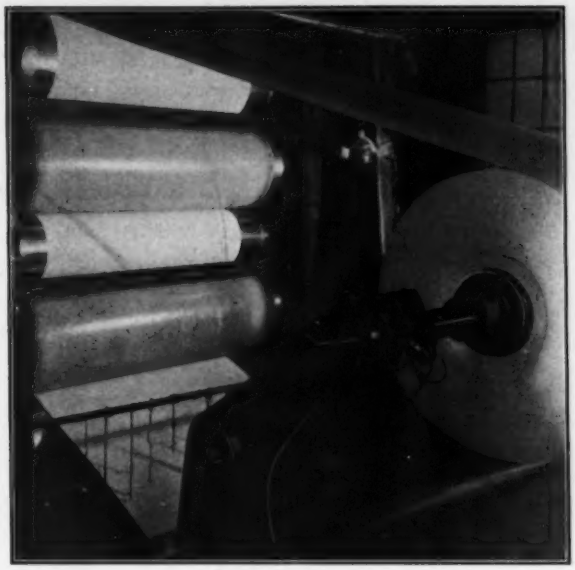
Benjamin T. Babbitt, a name long revered in soap, put his brand on the market in a new paper wrapper. People were suspicious of that, thinking it substracted from the amount of soap, or, at least, in some way decided against the quality. But Babbitt, always an earnest thinker, devised the first wrapper coupon with soap, a plan afterward made even more popular by the Buffalo, New York, house of Larkin. These years of the 1870's were outstanding for Yankee ingenuity. As they developed, plus the required machinery for production, the new fangled method of "ad-vertisements" soon spelled success for many manufacturers.

In the year 1884 the first successful typesetter was invented by Ottmar Mergenthaler, the linotype man.



(Courtesy, Keith Paper Company)

Dandy Roll for Watermarking the Paper



(Courtesy, Keith Paper Company)

Super-Calendering the Paper

Printers now cast an entire line at a time, thus aiding paper use and production in one complete movement of the hand. And sulphate pulp came, at that time, from Carl F. Dahl, at Danzig, Germany.

Kraft paper came as an accident to a batch of pulp, we are told. It was mixed in the usual digester at a Swedish mill, and the batch came out only partly cooked. Workman responsible is now unknown, and his supervisor, noting the error, had the batch run through a kollergang. He hoped to save some of the "spoiled" pulp. But he was surprised to find that it was stronger, better than the original pulp. Name of "kraft," indicating strength, was given to this new paper, now so much sought by many industries. But grinding in the kollergang has been replaced by beating and jordaning.

Dahl's famous idea was really a modification of the previous caustic soda process. But, in sulphate, the loss of soda is replaced by sodium sulphate salt, for the soda ash or caustic. All this made lower cost pulp. Sawmill waste was now easily consumed at mills in Scandinavia. This process was freely used in Europe, at the time, but required twenty-seven years before it was fully accepted in the United States.

Lanston, in 1884, made his first monotype machine. Waters, in northern New York, still busy with paper domes, also made more of the boats previously mentioned. Colleges like Yale, Harvard, Columbia used them for racing shells, they were so light.

Edward L. Mills devised and improved upon the Crane method of placing threads in bank notes. He used silk. So much counterfeiting was going on, at the time, especially with State bank notes, that the new national bills caused an immediate drop of 90% in that bold criminal practice. Sheets of daily announcements had previously been released to merchants, notifying them of the bad money, by descriptions and numbers. Bankers drastically surcharged desposited funds with that one feared word, "Counterfeit," in red ink across their face, when such bills were sent to the banking tellers.

Also, three color half-tone printing plates were made about this time. By 1889, paper production reached the annual output of one million tons in this country. Eleven years later, in 1900, the tonnage was 2,167,593, and nearly one-quarter, or 22%, of all the paper machines in the United States were then lying idle.

Books, magazines, newspapers, all increased in number and in size. With the advent of the cheaper (fifteen and ten cent), publications of McClure and of Munsey, plus the first illustrations from photographs in half-tone, these new and fine magazines jumped prodigiously in circulation. All the former publications were either 25c, 35c, or 50c a copy. And they were poorly illustrated with line cuts, else nothing at all, except low quality paper, with endless long pages and dreary paragraphs without periods. So the coming of the new magazines was a great boon for the paper industry. More machines were made to handle the better quality of calendered paper, now required for the pictures.

Advertising, too, no longer "ad-vertise-ments," took on a spurt in these newer publications. Newspaper advertising, long neglected as mere ink smeared permanent "copy" of business cards, names and addresses, now became conspicuous with its timely sales appeal to both men and women. Department stores expanded their advertising, their sales. Instead of retaining that ancient warning, "Caveat emptor," or "buyer beware" attitude of unknown pricing, the larger stores now adopted the more friendly policy of plainly marked prices, with merchandise guarantees, as originated by John Wannamaker, in Philadelphia and New York.

Patent medicines swept the country, with their false appeals to imaginary aches and pains. But they did, at the time, consume vast quantities of printed paper, even in ancient almanacs, religiously issued for all sorts of Indian and Gypsy pain killer. Sightless Joseph Pulitizer and the keen eyed William Randolph Hearst set the publishing and paper world afire in their competition for control of the reading public with their then new "yellow journalism." Comic strips, long stringently controlled by magazines like Puck and Judge, at last came into the open in Sunday supplement material, using more and more paper, as newsprint became a volume on each Sunday, instead of just a few sheets, dating from statistical Civil War casualty lists.

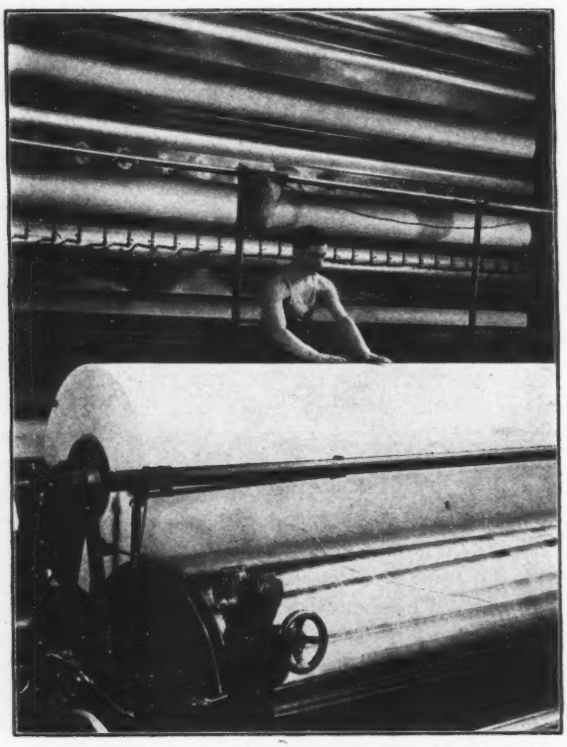
Publications, too, like the reincarnated Saturday Evening Post and the remodeled Ladies Home Journal, soon had a mass of circulation in the millions, a thing then brand new. Editorial content of enterprise was at last recognized in the work of George Horace Lorimer, a $25 reporter, and of Edward Bok, who took over the Journal in 1889. Ten cents, and even five cents, was now magazine money, not fifty cents.

Books, too, accepted the challenge. They poured out of printing and binding establishments, where, previously, they had merely trickled. In the final days of

the nineteenth century not only newspapers, magazines, books, were filling that long dormant demand of the public for cheaper reading material, but the consumer, too, was being offered merchandise in more attractive packages. This was apparent, almost at once, as automatic machines began making fancy and useful packaging for manufacturers of all lines of goods. Paper boxes, the thought and development of many men, were used for nearly all foods, displacing the "cat-in-the-cracker-barrel," for example. Charles Post, of Battle Creek Michigan, marketed the first breakfast food in a distinctive package. George Brownell perfected a machine to make paper twine, a previously hand tailored job for the necessitous days of the Civil War, also.

In the heart of New York City a paper mill was at last set up. Albert Newcombe, a paper mill engineer, decided to construct such a mill in the Bush Terminal Building, at South Brooklyn. There the Tidewater paper mill was built. It had two large paper machines for newsprint, furnishing 100 daily tons. It started operating in 1909. Pulp was brought down from the St. Lawrence Paper Mills, at Chandler, Quebec, and groundwood from the Chicoutimi Pulp Company, at Chicoutimi, Quebec.

With the advent of the first world war, up went paper prices again, as during previous wars, notably the Civil. New York Times acquired the Tidewater mill in 1916 for its heavy newsprint demands. In 1917, groundwood pulp advanced to $20 the ton. To show what a real war can do to paper, that same groundwood finally hit $145 the ton, newsprint $360 the ton. Publications had to reduce their sizes again, eliminating many features. To indicate the differences in prices of newsprint, for instance, in 1893 the cost was $56 the ton, finally dropping to $35, as of 1899.



(Courtesy, International Paper Company)

Smooth as Silk, These Long Rolls of Paper Come From the Fourdriniers

In 1927 the annual trade of the United States in wood pulp alone was about three million tons. But American timber was sharply cut—cut is the word. Spruce grew slowly, and the forests were being depleted rapidly, as the excessive stumpage in the northern States soon testified. To Scandinavia, then, went forth our American mills, also to Canada, for pulp. They found all they desired, at the time.

From the rise of kraft paper in this country, in 1909, to its present state of huge requirements, the paper industry has traveled many new lanes of progress. Boxes and barrels, even great wooden shipping cases of many sorts, have gradually been replaced by the less costly, lighter, more easily handled boxes made of this extremely tough paper. Color and design also helped the development, not only in heavy and in light packaging, but in all forms of paper for mercantile and industrial use.

With the development of the industry in this country, many new facts were provided. For example, the use of southern pine forests for sulphate pulp. Dr. Charles H. Herty had been a foremost developer of this sort of industry. From 1934 these experiments continued until the practice was an accepted commercial fact. Even Texan forests have been successfully occupied by new mills for newsprint of southern timber. Since 1940, this has been the outstanding fact in newsprint production.

In 1943, pulp from abroad became scarce again, because of the second world war. Formerly, great cargoes even sailed the old and majestic Hudson River, delivering their Scandinavian shipments at Albany. At one time, only a few years ago, it was believed impossible to navigate the Hudson with ocean going craft. But the Federal Government expended vast millions to make this channel seaworthy.

World War Two caused the usual vast increase in paper demand. It also caused development, then and now, of 700,000 items essential for war, and, some of them, now necessary in peace, to be manufactured of, or wrapped, with paper products. Few would believe it, but a noteworthy paper State, home of the industry for many colonial years and thereafter, Massachusetts, had a new battleship named for it again, and it took 100 tons of paper in the craft construction. Sixteen tons of blue print paper alone were used.

Converting—that is the paper word, too—the industry to the years of peace, which are sincerely believed to be our future, the use and extension of machinery and equipment shall be even greater in production than ever before. This is guaranteed by present plans of industry, all industry. No business, no trade, can develop without paper. in some form. And thus machinery shall play its full part.

CHAPTER XIX

Increasing Importance Of All Kinds of Containers

UNTIL the beginning of the 20th century there was no general or widespread use of individual paperboard boxes, or "containers," as we know them today. During the Gay 90's—and actually prior to that — the retailer's stock, whether of drugs, food, hardware, or whatnot, was received in bulk lots. It was displayed on open shelves, in wooden bins and boxes, and in burlap bags. It was the duty of the retailer, during those "good old days," to weigh out, cut, or otherwise divide the lot into smaller sales units, and to wrap and prepare each for sale.

Sugar and crackers were scooped from open barrels, after having been exposed to dust, moisture in the air and breakage, even the store cat asleep in the barrel of crackers, for example. Butter and lard were cut from tubs into small consumer units, and were weighed, wrapped and tied as individual customers made their purchases. Vinegar and molasses were drawn from kegs or barrels into cans, bottles or whatever other receptacle the customer wished to provide. There was no guarantee of a sanitary product.

Brand names were practically unknown. The retailer bore the responsibility for the quality of the merchandise, rather than the manufacturer. There was no individual container for the customer to carry his purchase home in, other than the unbranded one he brought, or the one furnished by the storekeeper. Fixed prices were uncommon, and bargaining was the general rule. Most commercial transactions were governed according to the ethics of the horse trader. Common rule of selling was "caveat emptor"—let the buyer beware.

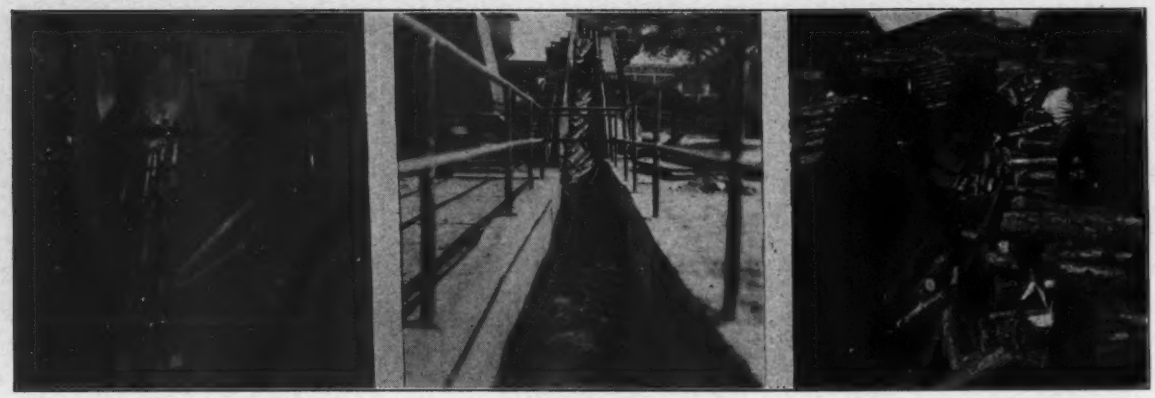
A common example of the unbranded container was the one in which the neighborly druggist dispensed his potions from bulk lots. He compounded his own formulae, to relieve common sufferings, and made up his own cough syrups, hand lotions, laxatives, toothache remedies, tonics and ointments. These were mixed in the "back room," from bulk lots of the individual ingredients, and, although the bulk-lot can or bottle carried the manufacturer's label, the customer, as in the case of his purchases of foodstuffs, had no idea as to the brand or make of the ingredients being supplied.

In like manner, hardware items were packed in bulk, carpet tacks being excepted. The tack manufacturer, for some time, had distributed his tacks in mandrel-fashioned, heavy-paper sales units of one-fourth pound, half-pound and one-pound each, the ends of which were fastened in with tacks and string. The familiar "parer of tacks" was on most hardware shelves. Though crude in appearance, as compared with the sales package of today, it is geierally credited with being the forerunner of the modern folding box. It embodied many of the basic characteristics of the folding box, and pointed the way to individual packaging.

Today, the folding paper box is a modern packaging aid. Shelves and counters of today's big new grocery stores and drug stores, where volume of sales and large turnover are vital to profit, carry whole masses of items packaged in folding boxes. Coffee, cereals,

1,500 Feet the Minute Container Paper Board Moves Up on this Fourdrinier
Left, This 16½ foot wide sheet of container board is finished on the calender stack at the right and rolled on the winder; Right, Back in the rear can be seen the 340 foot long hood, which is also 30 feet wide, covering the 102 steam-heated drying cylinders.

(Courtesy, International Paper Company)



(Courtesy, International Paper Company)

Shoot-the-Chutes to the Barking Drums

Left, Barked by friction as the logs tumble through the revolving drum at right, then dropping into conveyor to the washers above; Center, Pulpwood from storage, or by rail or truck, floated to head of 1,600 foot concrete flume, to be picked up by chain conveyor in background; Right, As the logs are unloaded from the pulpwood freight cars for the barking drums. Trucks and barges also bring in the logs, so considerably necessary for the constantly increasing production of the large American Mills. Logs are the answer to greater and greater output demanded now by paper consumers.

flavoring extracts, butter, bacon, soaps, dry chemicals, and patent medicines are so packaged. Small tools, rubber goods, electrical appliances, liquors and quick-frozen foods are so successfully distributed in paper containers that no manufacturer can afford to overlook their possibilities.

Through appropriate design and a combination of art work, color and printed message, the paper container can be made to carry enough visual appeal and attraction to create an irresistible buying urge. Just as the graceful streamlined body of the shining new automobile means many a sale, purely because of the buying impulse created, so can the modern, attractively printed, container of paper mean many a profitable sale of the product it carries. The buying public has been educated to the attractive package—and unconsciously selects it.

Story of the paper container covers many years, during which it developed into the modern package we see today. Perhaps the first container that primitive man used was itself the source of the paper used in making today's paper container, a hollowed tree stump, in which he may have stored his food, or from which he may have drunk rainwater. It wasn't until many years later that he discovered the secret of the wasp, and began the making of paper from wood pulp.

Cornerstone of modern civilization, and with it the making of paper, was laid in that far off day while the Roman Empire was young, and its legions were subduing the skin-clad savages, who roamed the British Isle and the forests of France and Germany. An official of the court of the Chinese Emperor Ho Ti, the court's chief eunuch, Ts'ai Lun, of Keui-yang, prepared the way for the age of paper in which, historians tell us, we are now living.

In those ancient times writing and inscriptions were generally traced upon pieces of bamboo, or upon strips of silk, which were given the name "chih," or paper. But silk, being costly, and bamboo, heavy, these two materials could not be used conveniently. So it was Ts'ai Lun who conceived the idea of separating animal and plant fibers, and forming them upon a screen or mould into the substance that we now call paper. He made a report to the Emperor upon his researches in papermaking, reciting his work with tree bark, hemp waste, old rags and fish nets, and was highly commended upon his competency.

Improvements in the process of papermaking were advanced by Tso Tzu-yi, a young apprentice of Ts'ai Lun, and the craft of forming sheets of paper spread throughout the Empire. From this beginning, the spread of papermaking, and its subsequent use in the making of containers, winds its way through conquests and crusades to reach the less colorful, but no less interesting developments of modern times.

While China was enjoying its greatest civilization, Europe was bound in superstition, with Christianity fighting for the souls of barbarians. Daily life of Europeans was dominated by wars, fears and uncertainties. Almost overnight the light of a new religion appeared among the pagan tribes, which lived obscurely among the sand dunes of Arabia. Islam, the nation of faith, created by the prophet Mahomet, grew like a whirlwind in the desert. Nearly 600 years after Ts'ai Lun discovered how to make paper—in 704 A.D.—Arab followers of Mahomet captured the city of Samarkand, western outpost of the vast Chinese Empire in Turkestan. In that city they discovered Chinese workmen, who knew the secret of papermaking. It was then that the invention of Ts'ai Lun entered the western hemisphere, as we have previously observed in this work.

Love of learning, manufacturing skill, and commercial enterprise nurtured the rise of the great empire of

Islam, extending, at its pinnacle, from Africa eastward to the Phillipines. Papermaking tended to serve the growth of the empire. First paper mill in the Near East was established in Baghdad, scene of the mythical Arabian Nigths tales, in 794 A.D. As long as the Islamic Empire enjoyed its day of glory, Christian Europe did not gain the secret of papermaking. Moors carried the art to Morocco, and then to Moslem Spain. En route, it was improved in two important ways. Because of a lack of the inner bark of the mulberry, used by the Chinese papermakers of Samarkand, Arabs experimented with linen rags, and are credited with being the first makers of linen paper. Foot-power stampers were invented by the Arabs to replace the laborious Chinese method of macerating paper fibre by hand stamping. Anticipating the machine age, the Moors attached their stampers to the shaft of a water wheel, when they built a paper mill at Xativa, in Valencia, Spain, during the twelfth century. It was about this time that the Moslem civilization waned, and the Christian world awoke to continue the study of papermaking.

Probably the first recorded instance of packaging with paper was recorded in 1035, A.D. In that year the Persian traveler Nasiri Khosran, on a visit to Cairo, Egypt, was astonished to see "sellers of vegetables, spices, hardware, provided with paper, in which all they sold was immediately wrapped up, if it were not so already."

Only a few years after that, historically speaking, a physician of Baghdad writes of the source of the wrapping paper used by grocers: "The Bedouins and fellahs search the ancient cities of the dead, to recover the cloth bands in which mummies were swathed, and, when these cannot be used for their own clothes, they sell them to the mills, which make of them paper destined for the food markets." This was written in 1140, A.D.

In 1906, A.D., the Crusades, or Holy Wars, began as the Christian world was stimulated by the Islamic vitality. Commerce thrived, instead of being impeded by these wars. Christian invaders were inspired by the wonders of the Moslem civilization, and carried home with them new arts and sciences, among which was the art of papermaking. A paper mill was built in France at Herault in 1189, and early Italian mills were established at Fabriano, Colle, Venice, Montefano (in 1276) and Palermo. After 800 years, western man was to find the means of breaking the pall of the dark ages, and begin the brilliant period of the renaissance, through the medium of paper, invented by Ts'ai Lun nearly 1200 years before. Modern civilization was dawning.

First recorded manufacture of pasteboard in Europe was made in 1580, although this kind of board had been made in China and Persia centuries earlier.

In America, the first mill in 1690, built by the Mennonite Rittenhouse, had this contract seven years later: "Ten years ye sd. William and Clause Rittenhouse," the agreement read, "shall lett ye said Wm. Bradford his Executors or Assigns have ye refusal of all ye printing paper that they make and he shall take ye same at Ten shillings pr. Ream, As also ye sd. Bradford shall have ye refusal of five Ream of writing paper and Thirty Ream of brown paper yearly and every year during ye sd. Term of Ten years, ye writing paper to be at 20 s. and ye brown paper at 6 s. pr. Ream."

The item, "Thirty Ream of brown paper" is an early mention of wrapping paper, made from rags. Merchants, both in the Colonies and in England, made increasing use of wrapping paper and pasteboard during the eighteenth century. It was their demand for a cheap and plentiful supply of paper for merchandise packing which later stimulated the invention of papers made from straw and wood pulp. During Colonial times, however, paper wrapping remained a luxury, and there was little hint that the distribution of every kind of merchandise would be revolutionized by America's unique development of paper containers.

From Chipper to Digester to Washer

Left, After pulp is blown from digester, all chemicals are removed by the washing process. Revolving wire screen cylinder takes the pulp through both hot and cold water sprays; Center, Logs are cleaned through washers to chute, thence to revolving chipper blades in disk below; Right, Chips flowing from storage bin to digester, where chemicals enter from pipe at right. Top of digester is tightly sealed, with steam from base admitted to raise temperature and pressure for a two and one-half hour cooking.

(Courtesy, International Paper Company)

(Courtesy, International Paper Company)

From Corrugating Machine to Printer and Slotter

Left, This Georgetown, South Carolina, Mill of the International Paper Company operates two corrugating machines. On each machine three sheets of container board—two liners and a sheet of corrugating medium between—are combined to form a single sheet of corrugated board. This board moves through the machines at more than 300 feet a minute; Right, This is the printer-slotter machine for scoring, folding, slotting, printing. Each sheet has the pine tree trade-mark, plus the hexagonal certificate stamp. Cut and printed sheets are then folded, ends tapered or stapled, and the completed containers, flat, are shipped.

As the use of paper became greater, so did the scarcity of the raw material, rags, become more acute. Advertisements and rhymes, begging women to save their ragged garments, became common during the early 18th century, as we have also observed.

It remained for the German papermaker, Jacob Christian Schaeffer, to verify Rene de Reaumur's observation by actually making paper from wasps' nests. In 1765 he wrote: "It is generally known that the paper, which, according to all evidence, has been used in Europe since the twelfth century, is made of rags and worn-out linen. And the dearth of this material is now complained of everywhere. The most curious thing is that not only a certain kind of paper is wanting; statements of merchants reveal that, in regard to wrapping paper, cardboard, etc., the want is even keener," He went on to say that he had studied the observations of Reaumur, Seba, Guettard and other scholars, regarding papermaking, and had concluded that "every material which, like hemp and lint, consists of such soft, elastic, easily-separated fibres, as, through the action of water, turn to pulp, and, by drying, attain a certain stiffness and firmness, may be fit for papermaking."

The secret had been found. But the dream of producing a great supply of paper, according to the method of the wasp, led through a maze of technical difficulties, and did not become a reality until 19th-century inventors laid the mechanical and chemical foundation for modern papermaking.

In 1767, England invoked the Townshend measures, placing import duties on pasteboard and paper, among other items. Ultimately, this legislation was beneficial, since it provoked the industrial and political revolt that led to the just and rightful independence of the colonies.

First use of paper in Europe for building cabinets, bookcases, screens, and sedan chairs was recorded in 1772.

During the year 1774, Mrs. Patrick Delany began her so-called "Paper Mosaick," which soon became the talk of England and the European Continent. The work consisted of making boxes, tea-caddies, etc., through the building up of myriad small rolls of colored paper. Her work received the acclaim of King George III, and many examples of her work were exhibited in public museums. Her career was terminated when her sight failed in 1784.

Containers of a larger sort were listed in an English patent granted August 12, 1788, to Charles Lewis Ducrest, for his invention of "making paper for the building of houses, bridges, ships, boats, and all sorts of wheel carriages, sedan chairs, chairs, tables and bookcases, either entirely of paper, or wood and iron covered with paper."

In 1789, Congress laid a duty of 7½ per cent on imported paper, pasteboard and blank books. At this time, the paper mills of Pennsylvania were manufacturing 27,000 reams of various kinds of paper yearly. There were 53 paper mills within the range of the Philadelphia market. Such was the hesitancy of our lawmakers, at this time, in regard to matters of taxation and tariff, that the tariff was decreed for a temporary period only—from August 1, 1789, to August 31, 1790. Before its expiration in 1790 its term of life was extended.

Improvements, either in papermaking machinery or papermaking processes, were slow in coming. After the first United States patent laws in 1790 and 1793,

some patents were forthcoming, but only four related to the paper industry, during the period from 1790 until 1800. John Biddis, of Pennsylvania, received a patent in 1794 for making paper and pasteboard from sawdust. He built a mill for that purpose, and around it laid out and developed the town of Milford, Pennsylvania.

During 1800, Massachusetts mills produced cardboard, bonnet board, pasteboard, fuller's board and wallpaper, to the extent of 24,000 pieces; the latter, in Boston.

Work of Matthew Koops, in the search for new papermaking materials, towers above that of all his predecessors. Koops is considered responsible for the growth of the modern day paper industry. It was Koops who first made use of various vegetable fibres on a large scale. In 1800 and 1801, the Great Seal Patent Office, London, granted Koops three patents, the second and third of which covered the manufacture of paper from straw, hay, thistles, waste, refuse of hemp and flax, and different kinds of wood and bark.

Koops did not regard his paper as printing matter alone, but declared that wood fibre could be converted into a substance of great strength, consisting of paper layers. Koops went so far as to predict that paper would become valuable as a building material, if it were treated so as to become incombustible and impenetrable. From 1801 to the beginning of 1804, Koops' mill, the first in Europe in which materials other than cotton rags and linen were to be extensively used, produced the first commercially made paper in the Occident, fabricated from vegetable fibres.

First understandable account, meagre though it is, of the paper manufacturing pursuits in the United States, was compiled by Tench Coxe, of Philadelphia, a recognized authority at the time (1813), on statistics and economics. Value of all the manufactured products in the country was listed at $127,694,602, and, of that amount, the sum of $1,939,285 was credited to manufactures of paper, pasteboard, cards, etc., according to the government census takers. Coxe amended the figures of the census marshals by extending them to $172,762,676, slightly more than 35 per cent. On the basis of that calculation the value of products, under the papermaking schedule, would rise to more than $2,600,000. Paper and its derivatives, then, constituted only about 2½ per cent of the total manufactures of the nation.

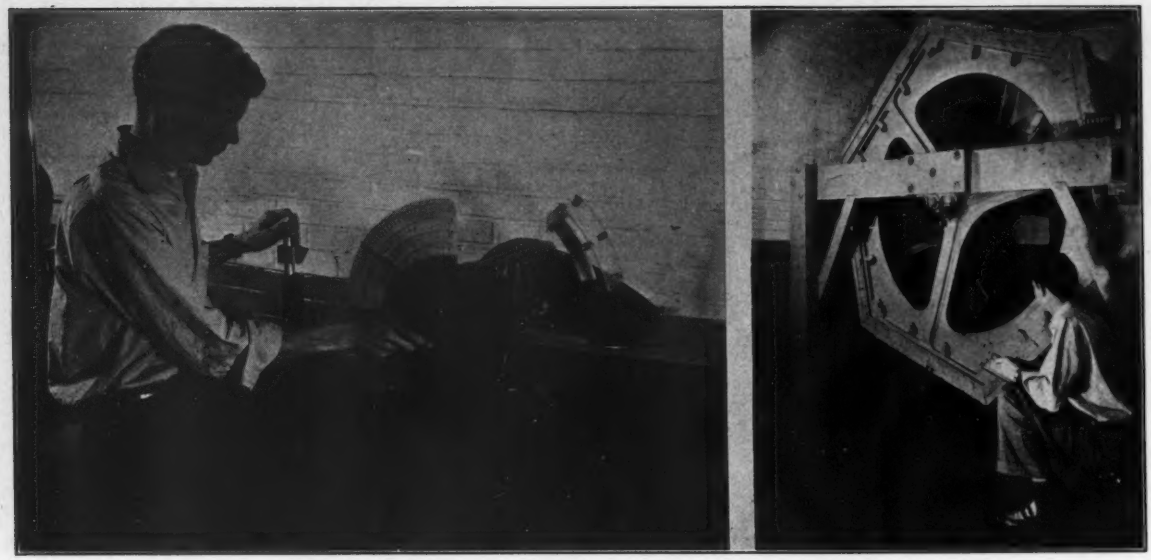
Isaiah Thomas was carrying on a similar investigation, at the same time as the U. S. marshals, and had this to say as part of his findings: "Of wrapping paper the quantity made may be computed at least at 100,000 reams, which will amount to about 83,000 dollars. Beside the preceding articles, of paper for hangings, for clothiers, for cards, bonnets, cartridge paper, paste-boards, etc., a sufficient quantity is made for home consumption. Some of the mills are known to make upwards of 3,000 reams of writing paper per annum; a few do not make any; but there are not many that make less than 500 reams. The quantity of rags, old sails, ropes, junk, and other substances, of which various kinds of paper and paste-boards are made, may be computed to amount to not less than three thousand, five hundred tons yearly."

Many of the handmade-paper workers regarded the

Spot Testing Container Board at International's Georgetown, South Carolina, Mill

Left, Laboratory technician takes strip to station where bursting and tearing strengths will be made from (Right) a strip taken from a full w idth roll. This goes on constantly.

(Courtesy, International Paper Company)



(Courtesy, International Paper Company)

Testers in the International Container Plant Laboratory

Left, Specimen of corrugated board is here tested for toughness, rigidity, quality of fabrication on a General Electric puncture tester. This is one of the best tests for all around fitness of the finished box; Right, Loaded containers inside the hexagonal drum tester. With each revolution, the boxes get six falls, plus a beating from the studded hazards inside the drum's surface. This establishes a sound idea of the resistance to rough handling of actual shipping.

advent of the perfected Fourdrinier paper machine as a detriment to their trade. Riots took place outside a mill operated by Marchant Warrell, at Two Waters, Hertfordshire, England, in 1812. In anticipation of trouble, the windows had been boarded, and, as an added protection, large bottles of vitriol were placed on the roof of the mill, so that the liquid might be poured upon the disgruntled handmade-paper workers, should they attempt to harm the newly perfected machine.

In 1815, Cramer, Spear & Eichbaum, printers, booksellers and publishers in Pittsburgh, Pennsylvania, published an advertisement in Cramer's "Pittsburgh Almanac," giving the paper prices that prevailed at that time in that part of the country. Medium wrapping paper brought $2.75 per ream; Crown wrapping paper, $2.25 per ream, and Foolscap wrapping paper, $1.75 per ream.

In February, 1816, the Secretary of the Treasury, A. J. Dallas, at request of Congress, transmitted to that body a review of the tariff of the United States, as it then existed, and a proposition for changes in tariff duties. He advised a duty of 35 per cent on "paper of every description, paper hangings, blank books, pasteboard, parchment, vellum and printed books." The duty then existing on paper was 15 per cent, and the proposed duty represented an increase of 133½ per cent, a larger increase than that upon any other articles, except clothing and woolens.

One record of the prevailing prices, during the early 19th century, has been preserved in a report presented to the national House of Representatives, in January, 1821, by the committee on manufactures. The committee favored imposing higher tariff duties for the protection of manufactures, and included in their report a statement of the kinds of paper then made in the United States, with ream weights and wholesale prices. Fuller's press papers were generally sold at 20 cents per pound. Sheathing paper, and paper used by sugar refiners, sold for approximately eight cents per pound. Common wrapping paper, sold by the ream, was graded in different sizes, as cap, pot, crown, demy, royal, super-royal, and so on, and sold at from six to eight cents per pound.

In 1824, the first machine for pasting sheets of paper together, forming cardboard, was invented. The patent was granted to John Dickinson, inventor of the cylinder machine.

Credit for making paper from straw into a product of great industrial value belongs to an American, George Shryock, son of a famous Pennsylvania papermaker. William Magaw produced the first paper in America made from straw, as we have seen. It is apparent that he discovered the process by accident, during the course of manufacturing potash in hoppers lined with long straw. He was able, it has been said, to sell a ream of his machine-made paper for less than two dollars, and an edition of the New Testament was printed on his straw paper at a cost of but five cents.

Magaw submitted his ideas on straw paper to Shryock, who operated the Hollywell Mill, near Chambersburg, Pennsylvania. Shryock was so impressed with the quality and economy of straw paper, after he had made careful tests, that he reorganized his

mill to make this new product in large quantities on a cylinder machine. Discovery of strawboard, which, in 20 years, revolutionized the manufacture of paper boxes, was made one day when he noticed that the layers of the wet web, that accumulated on the press roll, tended to form themselves into a solid board. He also made an important mechanical invention, a grooved wood roll or mandrel, which equipped cylinder wet machines to make heavier weights of paper and paperboard.

First enamelled paper was produced and patented in 1827 by John George Christ, of England. Enamelling was accomplished by using a mixture of animal size, gum, isinglass, and white lead. This mixture was applied to the cardboard or paper at three separate times, and, finally, given a high finish by using a polished steel plate, run through the press.

Columbia County, in New York State, was noted, some 50 years, for making paper from straw. Before 1825 there had been mills in this region, small affairs, making paper of the regulation kind, and in the regulation manner. In 1830, two papermakers, Haimlton and Wright, came from Connecticut to Chatham Four Corners. They brought with them knowledge of the workings of the new cylinder, and plans of the machine, which they had surreptitiously obtained. Purchasing a site on the banks of the Steinkill, they built a machine, and were the pioneers in straw wrapping paper in that section of the country. The partners separated in 1832, Hamilton retaining the mill, while Wright started a second establishment with a cylinder, in an old saw-mill on the same stream. During following years this property passed successively through the hands of Cornelius Shufelt, Rathbone & Simmons and Staats D. Tompkins.

Ebenezer Backus and Thomas Wheeler erected a third mill for straw paper, not far from the first Hamilton & Wright mill. Locally, it was known as the "mud-mill," on account of the brook, from which its supply was drawn. Fourth mill in the country was started in an old fulling-mill on the Steinkill, between Chatham and Chatham Four Corners, by William Davis and Plato B. Moore, in 1837.

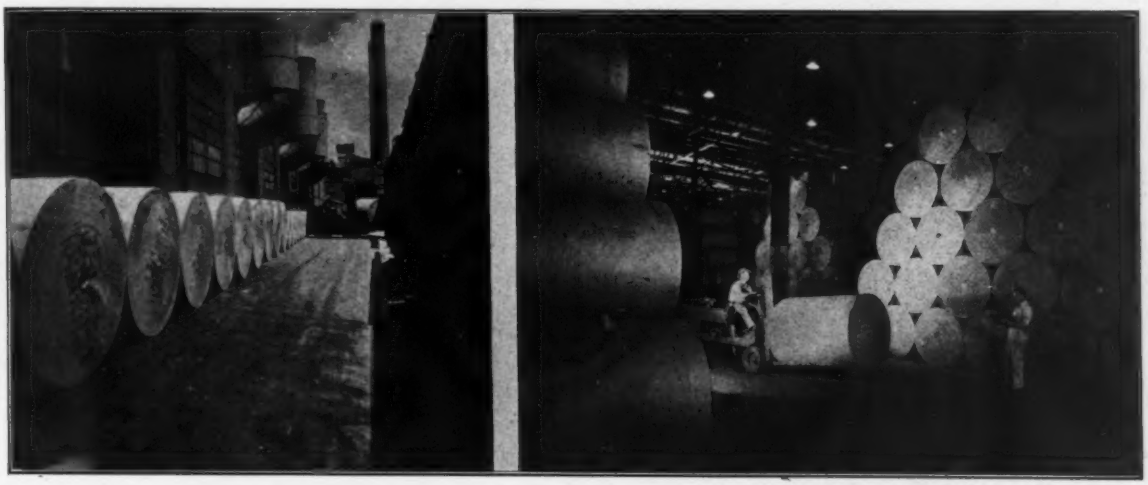
These four mills were the pioneers in the making of paper from straw, in this country. Making of paper from straw soon flowed over the border line of Columbia into Rensselaer County. In 1845, John B. Davis purchased a site for a mill on Kinderhook creek, in the town of Nassau. In the following year, 1846, associated with Peter C. Tompkins, he built the first mill for making straw wrapping in that country. It was the largest mill that had yet started on straw, planned for four thirty-inch Hollanders, and a thirty-six inch cyqlinder. Eventually, Tompkins sold his interest in this mill, and the business was continued by D. P., C. F., and Oscar Davis, sons of John B. Davis.

Upon relinquishing his interests in Rensselaer, Peter C. Tompkins returned to Columbia, where he took possession of and completed a new mill that his brother, Staats D. Tompkins, was building on the Steinkill, near East Chatham. He ran that successfully for manv years, and was the first manufacturer to make wrapping exclusively from straw, without hard stock.

Early in the nineteenth century, Zebediah Butler, Sr., and his son, Zebediah Butler, Jr., were interested in a paper mill at Hubbell's Falls, Vermont, and it was here that Oliver Morris Butler, elder Brother of J. W. Butler, learned his trade. The paper made was straw wrapping. This mill later became the property of James I. Cutler. Oliver Morris Butler went south to

Along They Roll to Storage and to Waiting Freight Cars

Left, Rolls of container board, loading into cars, over a ton to the roll. More than 1,100 rolls like this come from this mill every day. Stencil markings show serial number, weight, footage, test data summary; Right, Piling it up in the storage room, directly from the end of the machine. Eleven thousand tons of this container board are stored here for shipment, or about eight days production capacity.



(Courtesy, International Paper Company)

(Courtesy, Kalamazoo Vegetable Parchment Company)

Your Daily Bread, Too, Is Wrapped Hygienically and Safely in Protective Paper

Lee, Massachusetts, to perfect his knowledge of the paper industry, there having been erected at Lee a large and modern plant, representative of the latest and best ideas then known to the art of papermaking.

Oliver Morris Butler returned to Hubbell's Falls in 1840, and, being unable to collect certain obligations due him, he took paper in part payment, and brought the finished paper west, to Chicago. Although the venture was not particularly profitable, it marks the beginning of the present J. W. Butler Paper Company. In 1841, he moved west into Illinois, locating at St. Charles, a town about thirty miles from Chicago, and situated upon the Fox River. Here he immediately constructed a writing paper mill.

Mulready paper envelopes were adopted by the English Post Office in 1840. John Dickinson, the inventor of the cylinder machine, patented a process for running a silk or other kind of thread through the length of paper as it was formed on a paper machine, and this type of paper, known as "Dickinson thread paper," was used in making the Mulready envelopes.

First commercial paper boxes, for packaging, were credited to Colonel Dennison, who is said to have made them in his home in Brunswick, Maine, in 1843.

Oliver Morris Butler opened a jobbing house in Chicago, in 1844, to dispose of the paper made at his St. Charles mill. Several years later J. W. Butler, the former head of the J. W. Butler Paper Company, was placed in sole charge of the Chicago branch. Oliver M. Butler was also a part owner and president of the Lockport Paper Company, of Lockport, Illinois, a successful plant erected for the manufacture of straw board. He remained active in the trade, up to the time of his death, which occurred in 1888.

At mid-century, in 1850, paper bags were made for the first time, entirely by hand. Earliest automatic paper-bag machine was built in 1876. (In 1941 the annual consumption of paper bags of all sizes totaled 50,000,000,000.)

Although the use of folding boxes dates back to around 1850, it was in the 1890's that one large manufacturer made a complete innovation in his packaging methods to provide protection, convenience, distinctiveness, cleanliness and product identification. In that year a number of cracker bakeries merged into a strong national organization, The National Biscuit Company, and put out the newly developed soda cracker as their first and most important product.

Unlike the unleavened crackers in common usage, prior to that time, variously known by such terms as "hardtack" and "pilot bread," which could be kept indefinitely without deterioration, the new soda cracker had to be protected against both air and moisture, in order to remain fresh, crisp and appetizing.

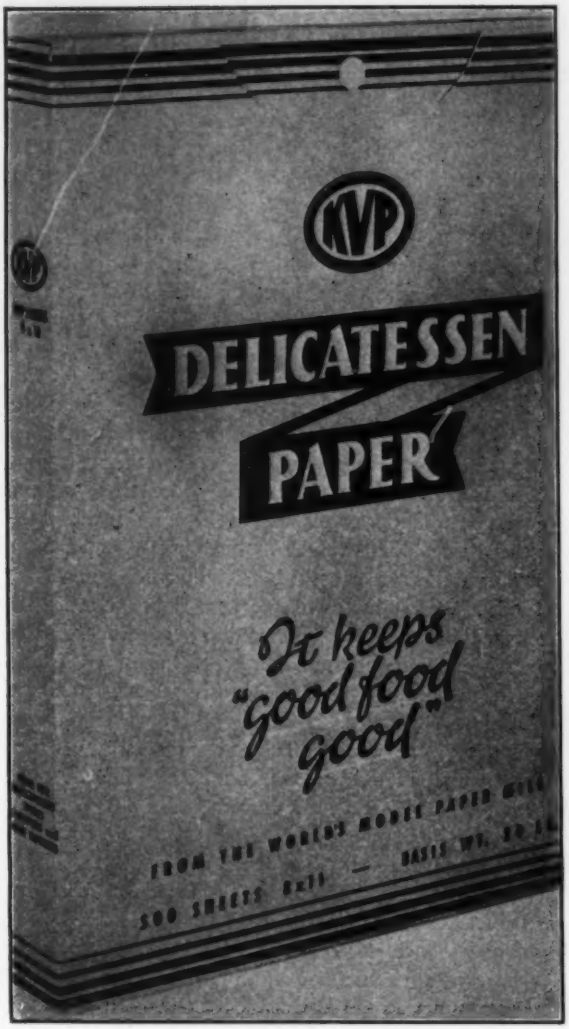
The manufacturer met the situation by introducing a folding paperboard box with a waxed-paper inner liner, and a distinctively printed and branded outer wrapper, called "Uneeda Biscuit," which completely sealed in the crackers. It was an innovation in packaging methods. In every sense of the word this cracker package was the modern sales-building aid. Not only was this modern package a sales volume builder for its sponsor, but its success was so great that other manufacturers quickly adopted the folding paper box.

About 1855, Egyptian mummies were imported to America, the wrappings and other fibres to be used in the making of wrapping paper for grocers, butchers and others. During the Civil War, I. Augustus Stanwood, who operated a paper mill in Maine, was pressed for raw material to keep the mill in operation, and had to use his ingenuity to overcome the difficulty. He imported mummies, stripped the dried bodies of their cloth wrappings, and used the material to make paper. He manufactured a coarse brown wrapping paper, which was used by tradesmen. Several other paper makers have been given credit for attempting to make a wrapping paper of the Egyptian mummy supply, which was destined to diminish.

First English patent, covering corrugated paper, was granted to Edward Charles Healey and Edward

(Courtesy, Kalamazoo Vegetable Parchment Company)

Full Array of Food Products Boxed, Then Wrapped in Protective Paper



(Courtesy, Kalamazoo Vegetable Parchment Company)

Delicatessen Paper—Just What It Says

Ellis Allen, July 7, 1856. Corrugating was accomplished by passing the paper between corrugated rollers, or by pressing between corrugated dies.

A time of scarcity of many materials, the Civil War served as a laboratory for finding new types of paper, and new uses for that paper. Research in wood-fibre development went hand in hand with experiements in the making of all manner of paper acticles. This was the beginning of the Paper Era. Conspicuous among the paper items manufactured were boxes and barrels.

As a final container, paper coffins were being manufactured in the United States in 1869, laminated sheets being used for this purpose. Persians, however, had made and used laminated-paper coffins hundreds of years previous to this date.

B. B. Taggart bought an old mill in Pamelia, New York, within the corporate limits of Watertown, Jefferson County, in 1866, and put in machinery for making news and manila. This was the beginning of the Taggart Brothers Company, which made rope papers and flour sacks. The concern went extensively into the manufacturing of paper bags.

In 1882, in Sandusky, Ohio, James J. Hinde and Jacob J. Dauch formed a partnership to produce straw for papermaking. Their chief asset was hard work, inasmuch as they had limited capital, and only a threshing machine and a straw baler. One of their customers was the Sandusky Paper Mill, which manufactured straw wrapping paper used by butchers. When the mill encountered financial difficulties in 1887, Hinde & Dauch leased the mill, then later bought it for $2,500. Demand for straw paper was so limited, however, that they were forced to look around for new fields for their product.

Original patents on corrugated paper, granted in 1856, had expired, and little had been done with it, anyway. But Hinde & Dauch developed their first corrugated container, the Climax Wrapper. The firm began to experiment next with shipping boxes made from corrugated paper. They were lighter and less expensive than the heavy wood type. These were sufficient reasons, in those days, to guarantee success. Long periods of experimenting were necessary to produce the first corrugated shipping box. Disbelief, prejudice and habit, among manufacturers, had to be overcome, for this was a radical departure from the wood crate, the nailed wooden box, the basket, and the wooden barrel. Packaging era was in full swing about 1894, with automatic machines for the making of paper boxes being in general use. Railway express companies accepted H & D corrugated shipping boxes to a limited extent in 1895. But is wasn't until fourteen years later, in 1906, that the railroads' acceptance of the corrugated box, for general shipments, provided the paper box manufacturers with a vastly increased market. Hinde & Dauch's first sale was made to an eastern manufacturer, who ordered two carloads of corrugated boxes for shipping cereal.

Great expectations were placed upon use of peat in making strawboard, late in the 19th century, and

(Courtesy, Kalamazoo Vegetable Parchment Company)

From Fish to Oleo and All Between

early in the 20th century. It was plausibly argued that the quantity of peat in the world is enormous, and the fibres derived from it would furnish a substitute for wood for boxboard and wrapping paper. Low cost of production, less than one-half the cost of strawboard, was an item in its favor. In the United States the business was established on a substantial scale by the Pilgrim Paper Company in a mill near Capac, Michigan, in 1906. The plant turned out thirty tons of box board every 24 hours. But, notwithstanding its apparently promising start, this "peat-to-paper" business fell by the wayside after a few years.

From 1900, the American scene changed rapidly, and much of this change was due, to a large extent, to the influence of paper. Correspondence and accounting records grew to an amount and complexity that would have been far beyond the imaginings of a 16th century bookkeeper, or even of an American businessman of 1850. With the increase in commerce came an increase in manufactured goods. Each new article of merchandise had to be packaged, labeled and shipped.

At first, paperboard packages were shipped in wooden boxes or large crates. But even these soon gave way to shipping cases made of paperboard, which saved weight and expense. In 1903, trial shipments were made, using corrugated fibre containers, which were authorized, as explained earlier, by the railroads in 1906. When railroad specifications required greater strength, jute fibres were added to the liner.

In the early manufacturing processes, double-faced corrugated board was made by hand application of the second liner. In 1900, however, J. T. Ferris, of the J. W. Sefton Manufacturing Company, invented and built the first combination unit for making double-faced corrugated board by machinery.

About 1910, the wrapping of bread in printed paper became universally used in America, as did the wrapping of fruit in paper. Apples were wrapped in a especially oil-treated paper, to control "scald." In the northwest of the United States, by 1941, there were more than 350 carloads of paper consumed each season in wrapping fruit. Earliest use of paper trays, for the drying of raisins, was recorded in California in 1915. More than 80 per cent of the raisin-drying trays were made of paper in 1940. Previously, they had been made from wood.

Shortages of lumber for boxmaking, transportation and other factors, created by World War I, accelerated the need for corrugated boxes. Manufacturers were beginning to appreciate the many advantages offered by the corrugated shipping box. Like the Civil War, which had given impetus to the Paper Age, the first World War hastened the use of corrugated containers.

Rapid acceptance of fibreboard shipping containers in the United States may be illustrated by the growth of this section of the paperboard industry, from 700,000 tons in 1919 to 2,005,800 tons in 1929, and to 2,732,400 tons in 1936. Such an increase in production probably would have been impossible without the development of the present type of multi-cylinder machine. Likewise, the Fourdrinier machine has been designed for board production at relatively high speeds, and is finding acceptance in the production of kraft liner.

In the United States, in the year 1939, alone, the average consumption of paper for each person was approximately a little more than 240 pounds. By way of comparison, the average was about 15 ounces in India. In the United States, in that same year, there were almost as many tons of wrapping paper produced as were used in the production of all books and newspapers. Paper boxes, cartons and packages, manufactured in 1939, weighed approximately twice as much as the paper used in books and newspapers.

Today, the products of American manufacturers are packaged in attractive and sanitary paperboard containers, and are shipped by boat, train, truck and airplane to local, national and world markets. During the recent World War II, new types of packages were developed which would withstand severe strain, dropping, changes in temperature, from the coldest Arctic weather to the hottest New Guinea hell.

New methods of waterproofing, to protect contents, even though the container be cast overboard, produced boxes tough enough to withstand a bursting test, up to 750 pounds per square inch. Both sellers and buyers have become independent of the seasons. Foods raised in the south now find their way to northern tables in the Winter.

Other nations have followed the lead of America, so that now the greater part of world commerce consists of merchandise neatly and safely packaged in paper containers, marked with well-known brands, promoted through advertising, distributed throughout the world.

A generally accepted belief, among business leaders is that the coming business era will be more highly competitive than ever. It is well-known that production methods have progressed faster than merchandising and distribution methods. Hence, greater advancements must be made in sales and in distribution, to provide, at a lower cost, an ever-expanding outlet for the new highs in mass production, achieved during the war. To this end, container manufacturers must strive to pioneer in new methods of packaging, and keep pace with the future.

COATED

MIAMI

PAPERS

"IN-STOCK" PAPERS

MASK-O-LITH — A litho coated bond built especially for masking purposes.

RITE-LABEL — A coated litho bond for heat-sealing labels.

LITHOKOTE — A coated litho bond especially built for Multilith and Davis equipment.

LEATHEROID COVER — A strong extra strong cover available in Gray, Ivory, Gold, Blue, Mandarin, Spice Brown, Wine, Ruby, Shamrock and Jet Black. Leatheroid is an in-stock paper. On making orders, 500# or more, we supply the same sheet in Levant and Morocco finishes, 20x26, 23x35, 26x40.

TITANEX — A titanium coated onion skin substance 17x22 — 12# in three finishes: Unglazed, Hygloss and Cockle in White, Pink, Blue, Canary and Goldenrod.

HECTOGRAPH BOND — For ditto or similar gelatin type hectograph equipment.

SPIRIT MASTER BOND — For master sheets for liquid type hectograph equipment.

LITHOTINTS — C1S in Ivory, India, Green, Blue, Canary and Rose.

BRILLIANTONE LITHOS — In Canary, Goldenrod, Turquoise, Orange, Emerald, Venetian Blue and Scarlet.

MIAMITINTS — C2S in Ivory, India, Green, Blue, Canary and Rose.

BRILLIANTONE ENAMELS — C2S in Canary, Goldenrod, Turquoise, Orange, Emerald, Venetian Blue and Scarlet.

STANDARD MASKING PAPER — In Goldenrod and Orange; substance 25x38 — 80#.

MIAMI COVER — C2S White; substance 20x26 — 60# and 80#.

COATED POST CARDS — Size 22½x28½. Caliper, .008, .010, .011.

COATED BRISTOLS — Size, 22½x28½. Caliper, .008, .010, .011.

RAINBOW TRANSLUCENTS — C2S in 22½x28½ — 3 ply or .010.

COATED TOUGH CHECK — In White and Colors — 3 ply or .012; 3½ ply or .015. On making orders of a ton or more — 4 ply or .018; and 6 ply or .024.

Specials

The Miami Valley Coated Paper Co. is especially equipped for the development of coated paper specialties for printing purposes, for packages, containers, linings, die-cuts and other special uses. We invite your inquiries.

THE MIAMI VALLEY COATED PAPER CO. FRANKLIN, OHIO U.S.A.

MANUFACTURERS OF COATED AND SPECIALTY PAPERS

2 New MIAMI Coated Papers

Plastex

WITH PLASTIC TOP COAT

GREASE-PROOF
WATER-RESISTANT
WASHABLE

• PLASTEX is available as follows:
• with plastic coated face in color and standard coated white back.
• with face side plastic top coated and reverse side uncoated.
• on making order, PLASTEX may be had with plastic top coat on both sides in any choice of colors; that is, with the same color on both sides or each side with a different color.
• PLASTEX is available in nine colors: Buff, Light Green, Canary, Light Blue, Light Gray, Emerald Green, Turquoise, Scarlet, Orange and White.
• STOCK SIZE: 22½×28½. Weight, approximately 200# per M sheets. Caliper, .008.
• PLASTEX SPECIAL FINISHES: Leather, Levant and Morocco Embossed.

DURALITE Bristol is available in your choice of White and 9 colors, coated one side. Also in duplex, your choice of 9 colors on the face and coated white back. On making order, DURALITE Bristol may be had coated both sides in the same color, face and back.

DURALITE Bristol

with standard coating

MIAMI *Plastex* and DURALITE *Bristol* are built on fine quality bleached sulphate base and have good strength and excellent folding qualities. Use these MIAMI Coated Papers for Menus, Ring Binders, Covers, Containers—and wherever the ultimate in sparkling beauty must be combined with adequate strength to assure permanency.

THE MIAMI VALLEY COATED PAPER CO. FRANKLIN, OHIO U. S. A.

MANUFACTURERS OF COATED AND SPECIALTY PAPERS

CHAPTER XX

From China Came First Wall "Hangings" or Screen Paper

CHINA, no doubt, originated screen and decorative papers. Japan and Korea, also the East and Near-East, finally competed for both design and quality of production. Examples of screen and decorative papers from the Orient, of early centuries, are in possession, for example, of the Dard Hunter Paper Museum, at the Massachusetts Institute of Technology, Cambridge, Massachusetts. But, even as American homes accepted the wall "hangings" from Europe, especially from France, in Colonial times, there was the urge here to produce something just as good, and better. It took time to accomplish this. But, from the evidence of this article, it is apparent that the result was successfully reached, and that most American wall papers are, today, remarkable specimens of the decorator's art.

July 14, 1948 it will be 60 years since the manufacture of wall paper was first introduced west of the Susquehanna river at York, in the State of Pennsylvania. Today, it is one of the leading industries of that city. Last year the value of wall paper produced in York was reported by the Wall Paper Institute of New York City to be $6,500,000.

York is a city of 56,712 population. It was founded in 1741, settled by Germans, Scotch, Irish and English, and is the county seat of York County, which is located in the southeastern part of the State. Separated from Maryland by the Mason and Dixon line, on the south, the Susquehanna river is its eastern boundary. The King's highway was the Monocasy road, passing from the city of Philadelphia through York to the south. Part of it is, today, the Lincoln highway leading through York to the Pacific coast.

One of the settlers to take up his residence in York, when the town was still under the jurisdiction of George III of England, was Jacob Durang, a surgeon

Oriental Wall Paper

Specimens of Chinese wood-blocks and the papers printed from them. The Paper Museum has an interesting collection of early wood-blocks from China, Japan, Korea, Manchuria, Tibet, Mongolia and India Wood-blocks, such as shown in this photograph, were formerly used in printing the wall and screen papers.

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Miles and Miles of Wall Paper from Sheets to Rolls, in the Days When Women's Dresses Were Almost as Long as the Rolls of Paper

of the French army. He came with his bride to Lancaster, where his son, John, was born in 1768, and then located in York. John, who spent his boyhood days there, wrote in his diary, now in the possession of the Historical Society of York County, that "Yorktown was a dull place for business for merchants and most mechanics." The town was then not 50 years old, and had a population of only a few hundred people. York County's inhabitants, during the war of the Revolution, were exceedingly patriotic, and energetic supporters of Independence, although the Germans were at first troubled by the long tailed oath to support the King they had taken when they first came to America.

The paper industry of York originated in the Codorus Mills, built by Philip J. King. These mills were among the oldest in the State of Pennsylvania. King made high grade writing paper. He was born February 24, 1764, and began the manufacture of paper about 1799. Machinery was moved by water power. A mill and brick dwelling house, nearby, were built about 1810. He died March 2, 1829, at the age of 85 years.

One of Philip's sons was George King, who was educated in York. From the time he left school, George engaged with his father in the manufacture of writing paper. Their notes and foolscap paper had the reputation of being among the finest known to be made anywhere.

While engaged in the business, it is told of George King that he supplied all the clergymen of his acquaintance with writing paper without cost. The brand which attained great popularity was known as "Congress," and specimens are still in existence in and about York. The mills are located on the south bank of the Codorus creek, the stream from which the mills derive their name. The highway, nearby, is called King's road, after the mill proprietor. Following the death of George King, the mills were sold by his heirs to Alfred D. Jessup, and later, in turn, to Jere Horton and the York Water Company.

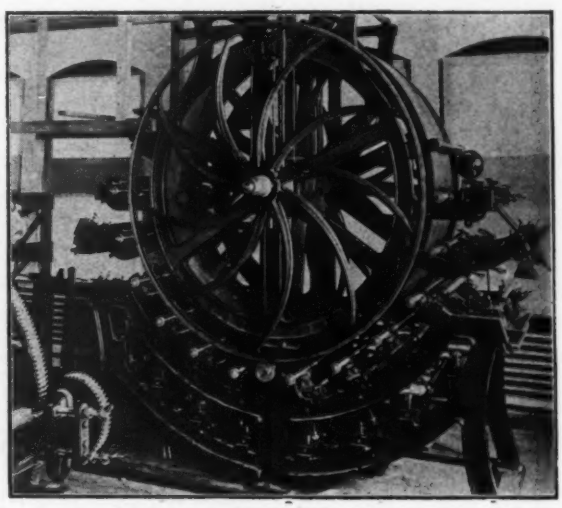
It was in July, 1888, that the manufacture of wall paper was started in the Codorus Paper Mill. The A. A. Yerkes Wall Paper Company moved that year from Philadelphia, took possession of the building, and manufactured and printed its own paper. The firm remained in York for four years.

Yerkes, so far as known, was a business man only, and not experienced in the manufacture of wall paper. He married Ella Ehret, daughter of Michael Ehret, of the Warren Ehret Roofing Company, Philadelphia. Mr. Ehret was a wealthy man, and is supposed to have financed the company of his son-in-law.

Yerkes brought with him from Philadelphia John McCoy, and he became an outstanding figure in the wall paper industry in York. McCoy was born September 5, 1856, in Philadelphia, the son of Robert McCoy. He received his education in the public schools of his native city. When only ten years old, McCoy procured work in a wall paper factory. For many years he was employed in factories as a wall paper printer and foreman, having been a color mixer, by trade. His first position of importance was that of foreman in the paper factory of the Janeway Company, New Brunswick, New Jersey. At the expiration of that period he was similarly employed in the works of the Yerkes Company, in Philadelphia. Before the company moved to York he had been made manager of the plant in Philadelphia, and was similarly employed in the new location. He was not a paper maker.

The Yerkes Company continued to manufacture wall paper in York until 1892, when the busines was purchased by the National Wall Paper Company, known as the trust, and the plant closed. Yerkes returned to Philadelphia. After Yerkes returned to Philadelphia, F. M. Rudolph, whose father had been one of the early employes of George King, leased the plant.

In 1897, the Schmidt & Ault Paper Company, with John C. Schmidt, president, and Robert A. G. Ault, secretary and treasurer, purchased the Codorus Paper Mills, and is the present owner. The Schmidt & Ault Paper Company manufactures coarse and wrapping grades of paper.



Equipment in a Wall Paper Mill

Paper Mill Where York Card & Paper Company Started in York, Pennsylvania, About 1894

When the National Wall Paper Company bought out the Yerkes Company, McCoy was not satisfied with the new position offered him. In the meantime, he conducted a small factory on Penn street, near Market, making cards for mounting photographs, which were extensively used by photographers in the early part of the century.

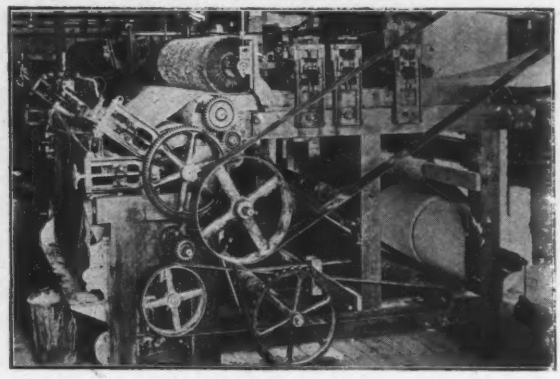
The National Wall Paper Company had bought up and consolidated every wall paper plant in the country, except two. It also attempted to control raw materials, etc., going into the manufacture of paper. As soon as its organization was completed there immediately sprang up, all over the country, a crop of new companies.

McCoy conceived the idea of launching a wall paper manufacturing business independent of the trust, and associated himself with Judge W. F. Ray Stewart, in the organization of the York Card and Paper Company. Judge Stewart served on the bench of the courts of York County for ten years. Professionally, he attained a high position through his sterling integrity and sound judgment, as well as his erudition; while, in the industrial and financial world, his projects, by their uniform success, showed the master mind that conceived and executed them.

He was of Scotch-Irish extraction, in both paternal and maternal lines, was born in Chanceford township, York County, Pennsylvania, February 25, 1849. His mother was a daughter of Thomas Bay, of Coopstown, Harford county, Maryland, who, for many years, was judge of the Orphans court of Harford county, and who commanded an artillery company at the battle of North Point in the War of 1812.

In 1893, a charter was obtained for the York Card and Paper Company with Judge Stewart, president; John McCoy, vice president and general manager, and

Wall Paper Patterns of an Age When Rocking Chairs Were Standard Furniture, Even in a Paper Mill



From Plain Paper to Printed Paper, to Go On Someone's Wall

John S. McCoy, son of the vice president, then thirty years old, as secretary and treasurer. They were joined in the organization by the Rev. H. H. Weber, D. D., a Lutheran minister, Jacob M. Smyser and others.

McCoy, too, was Scotch-Irish descent, and had those qualities that enabled him to put up a strenuous fight against those who tried to throttle the new enterprise. Companies, which made wall paper manufacturing machinery, had, it was claimed, been subsidized by the trust, so the York Card and Paper Company found it impossible to purchase needed machinery.

This did not halt, although it delayed, the operation of the new plant. Judge Stewart was interested in a number of corporations in York, of which he was the chief operator. Among these was the iron foundry of Baugher, Kurtz & Stewart. When the new paper company found the purchase of new machinery blocked by the tactics of the trust, the officers had the machinery made in the iron foundry, in York, of which Judge Stewart was part owner, from plans by McCoy. Thus, the trust was defeated.

The York Card and Paper Company was the first to organize outside the combine. Things did not go well, and, in a few years, the National Company bought the York Card and Paper Company, and then organized all the remaining outside companies into a new trust or working agreement, known as the Continental Wall Paper Company.

The court is reported to have attacked the trust, and its attitude was declared illegal, so that, in 1900, the combine was dissolved. This gave Judge Stewart and the senior McCoy an opportunity to buy back the York plant, which they did on a 50-50 basis. John McCoy died in 1915, and it was after that that his son, John S., came into the picture as manager and officer of the York Card and Paper Company.

Along about 1920, John S. McCoy had a friendly difference with Judge Stewart on the question of expansion. It was through this that McCoy was able to purchase Judge Stewart's entire holdings in the York Company.

McCoy sold out to the United Wallpaper, Incorporated, in 1927, and remained with it in the capacity of general manager and vice president until his retirement in 1939. He is now living in Santa Monica, California.

Other companies included in the corporation were the Robert Griffin Company, Jersey City, New Jersey and the Standard Wall Paper Company, Hudson Falls, New York and Joliet, Illinois. The Hudson Falls and Griffin plants are no longer operated.

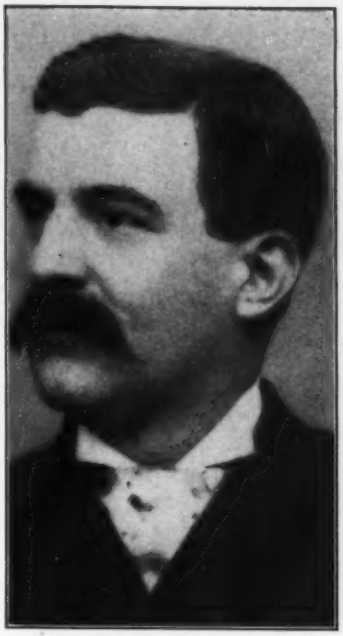
The York Card also bought the Art Wall Paper Company, Chicago, in 1924. This plant has since been closed.

With the closing of these plants, the machinery was moved to the more modern factories.

Printers and Mixers of Wall Paper Stock in the Days of Long Mustaches and Dignified Ties, About 1900

The United Wallpaper, Incorporated, mill in York, the largest wall paper manufacturing plant in the United States, is believed to be the largest in the world.

At present, the company employs 574 people, just double the number in the pre-war year of 1941. This is the greatest number ever employed in this plant, and production and payroll are higher than ever before. The highly skilled, industrious and loyal corps of employes, with their fine co-operation, are producing the highest quality of wall papers ever made. These papers are all in the medium and upper grades. They cover a wide range of styles in highly artistic designs. Some are ready-pasted. They are all wall-tested, and guaranteed to be lightfast and washable. These products are sold throughout the United States, and in many foreign countries.



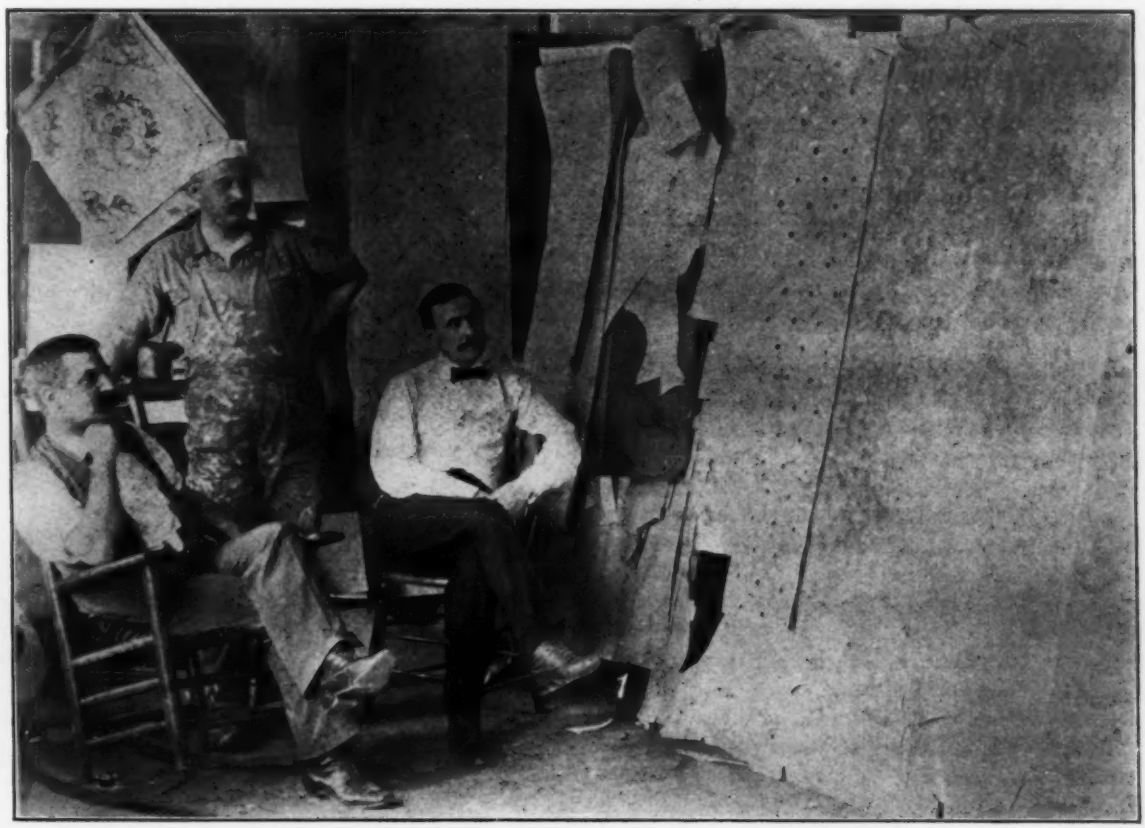
Founder John McCoy, Sr.

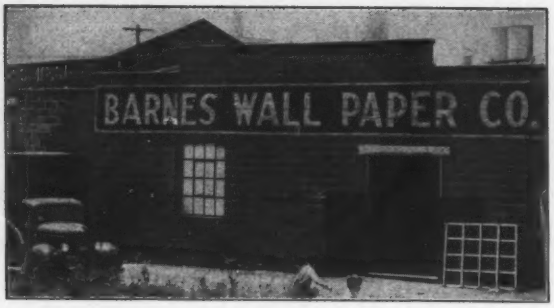
Edwin A. Gentzler, plant manager, said: "We are installing 11 new machines of improved design, which will operate more smoothly, require less power, and produce papers of a higher decorative value than present equipment. When this installation is completed, we plan to install new dryers that will be more compact and more efficient. These will not only release a lot of valuable floor space, but will give our employes more comfortable working conditions. We feel assured that employment at our plant will remain at its preesnt level for a long time."

Through its large-scale production of fine wall paper, the York mill has contributed much to the attractiveness of the American home. Here, research and testing have been carried on, and new development and improvements in wall paper production utilized. Result of this study is that wall paper, of real decorative importance and highest quality, once a luxury item, is now available at moderate cost to homemakers.

United Wallpaper, Incorporated, is proud of its war record. It received one of the first 25 Army "E" awards in the country. During the war more of the company's employes were engaged in war work than in the manufacture of wall paper.

Old Timers in the Wall Paper Business, Admiring Specimens of Their Work





(Courtesy, The Barnes Wall Paper Company)

Factory at York, Pennsylvania

The corporation had three plants doing war work during World War II, including some in York. The large plant in Aurora, Illinois, manufactured army and navy parachute flares, smoke and fire bombs for use against the Japanese, ground magnesium for high explosives, loaded star shells, made navy float flares and loaded rocket igniters. As many people were employed in war production at the Aurora plant as in all other mills.

The Clearing, Illinois, plant, located in the suburbs of Chicago, made smoke bombs and thermit incendiary bombs. The Long Valley plant, in New Jersey, loaded gasoline jelly bombs for chemical warfare service, U. S. A.

One hundred and fifty-five men from the York plant were in the armed service during World War II.

Employe-company relations at the plant have been exceptionally good. More than 50 employes have worked for the company more than 25 years. The employes enjoy vacations with pay, are paid for six holidays each year, and receive Christmas bonus based on years of service with the company. They are given at no cost to the employes.

Three employes of the company are members of the Fifty-Year Club. They are Miss Alice B. Myers, 52 years; Bert L. Kopp, 51 years, and Bert F. Reichley, nearly 51 years.

November 9, 1894 a group of men met in York to discuss the feasibility and propriety of forming a new wall paper company. At that meeting the following officers were elected: President, George W. Bell; first vice president, Robert S. Shetter; secretary, J. R. Davis, and treasurer, Peter C. Wiest. George W. Bell was appointed general manager. Application was made to the courts for a charter, and it was received January 10, 1895.

The new organization became known as the York Wall Paper Company, and the first meeting under the new charter was held January 14, 1895. Mr. Bell, the president, presided. At a meeting of the board on March 30, 1895, it was decided to purchase from Peter C. Wiest the real estate, at Linden avenue and Warren street, for the sum of $15,000. The president and secretary were empowered to give a mortgage in the sum of $15,000. A building was erected and occupied in a short time.

The plant was entirely destroyed by fire, November 12, 1895, and the stockholders, at a special meeting November 14, 1895, resolved "that the officers be and are hereby authorized to make arrangements to rebuild and resume business as early asp ossible." The building was all new, and was erected at a cost of $200,000. sume business as early as possible." The building was all new, and was erected at a cost of $200,000.

Charles H. Stallman, a York man, was elected to the board of directors in 1896.

In the year 1899, James H. Findley, of Schuylerville, New York, who had been associated with the Liberty Wall Paper Company, New York, became president; Granville Sharp, vice president, from Salem, Ohio; P. J. Gilbert, secretary; I. B. Cameron, former State Treasurer of Ohio, treasurer, and C. H. Stallman, assistant treasurer. Other directors were R. Chamberlain, of East Liverpool, Ohio, where he had been engaged in the pottery business, and George Hoyer, York, Pennsylvania.

Mr. Findley became a nation-wide figure in the wall paper business, being a director of the Wall Paper Manufacturers' Association of the United States. He served as president of the York Wall Paper Company until his death July 24, 1919. Prior to coming to York he was a member of the firm of Findley Brothers, of Cleveland.

The industry developed steadily, and, in 1907, the annual output of the mill was 12,000,000 rolls of paper.

Attorney John A. Hoober, York, became president of the concern after Mr. Findley's death, having acquired all his stock. With the stock he already had,

(Courtesy, The Barnes Wall Paper Company)

Left, Louis Berkheimer, Plant Manager; Right, Walter R. Richter, President, Barnes Wall Paper Company, York, Pennsylvania

this gave Mr. Hoober controlling interest in the company. All other officers were retained. Mr. Hoober was president until 1932. He sold his entire interests to Earl G. Kegler, a salesman for the company, that same year. Mr. Kegler was elected president, a position he held until his death in 1936.

Mrs. I. S. Kegler, widow of Earl G. Kegler, has been head of the firm since 1937. Her son, J. S. Kegler is the secretary and treasurer. Mrs. Kegler is one of the few women in the country who is serving as head of a wall paper firm. The Keglers also operate the Gilbert Wall Paper Company on the third floor of the same building. The Gilbert company began operations as a four-machine plant in 1904. It was operated by Paul J. Gilbert, a stockholder, and his brother, Joseph. The plant, which employs 40 persons, was acquired by the Keglers, November 1, 1945.

The York Wall Paper Company employs between 155 and 175 persons. R. H. Hoopes, production manager, one of the oldest employes, has been with the firm 52 years. There was a steady increase in the volume of business, and new machinery added through the years.

The Barnes Wall Paper Company was founded in York in 1909 by William A. Barnes and two sons, Albert and Rudolph. It was incorporated in 1919. The company built and opened a new plant in Mountville in 1935, known as the Mountville Wall Paper Company, which was managed by the son, Albert. The plant, employing 50 workers, is still in operation. The mill in Mountville, Lancaster County, Pennsylvania, is now owned and operated by Albert Barnes, who acquired ownership January 1, 1947. The elder Mr. Barnes died about 25 years ago. Albert and Rudolph retired from the Barnes company management about twenty years ago.

Walter R. Richter, president of the Barnes Wall Paper Company, has been associated with the firm for twenty-seven years. Louis Berkheimer, plant manager, has been with the firm for thirty years. The York plant, located at North Sumner street and Hoke's Mill Road, is a modern brick building, one and two stories in height, which was remodeled fifteen years ago. It is equipped with the latest machinery for the manufacture of general wallpaper.

When the plant was organized there were 20 em-

Barrels and Pails, Barrels and Pails—Mixing Formulae for Wall Paper Stock Long, Long Ago

ployes. Number of employes has steadily increased, along with increases in business until now 90 persons are employed. Increase in business made it necessary to enlarge the building on four occasions. The plant is now four times the original size. Products made by the company, which has fine employee-employer relations, is shipped over the United States, with large amounts going to China and England.

Everett R. Heffelfinger, founder of the wall paper plant in Hanover, York County, Pennsylvania, became connected with the wall paper business when, as a boy of fourteen years, he started as a door-to-door salesman for a retail wall paper store in Philadelphia. At the age of sixteen years, he began working in a wall paper factory, and, at the age of eighteen years, started on the road as a wall paper salesman, selling to jobbers and book houses. While employed as a traveling salesman he made approximately twenty-five trips to and from the West Coast, and visited every State in the United States.

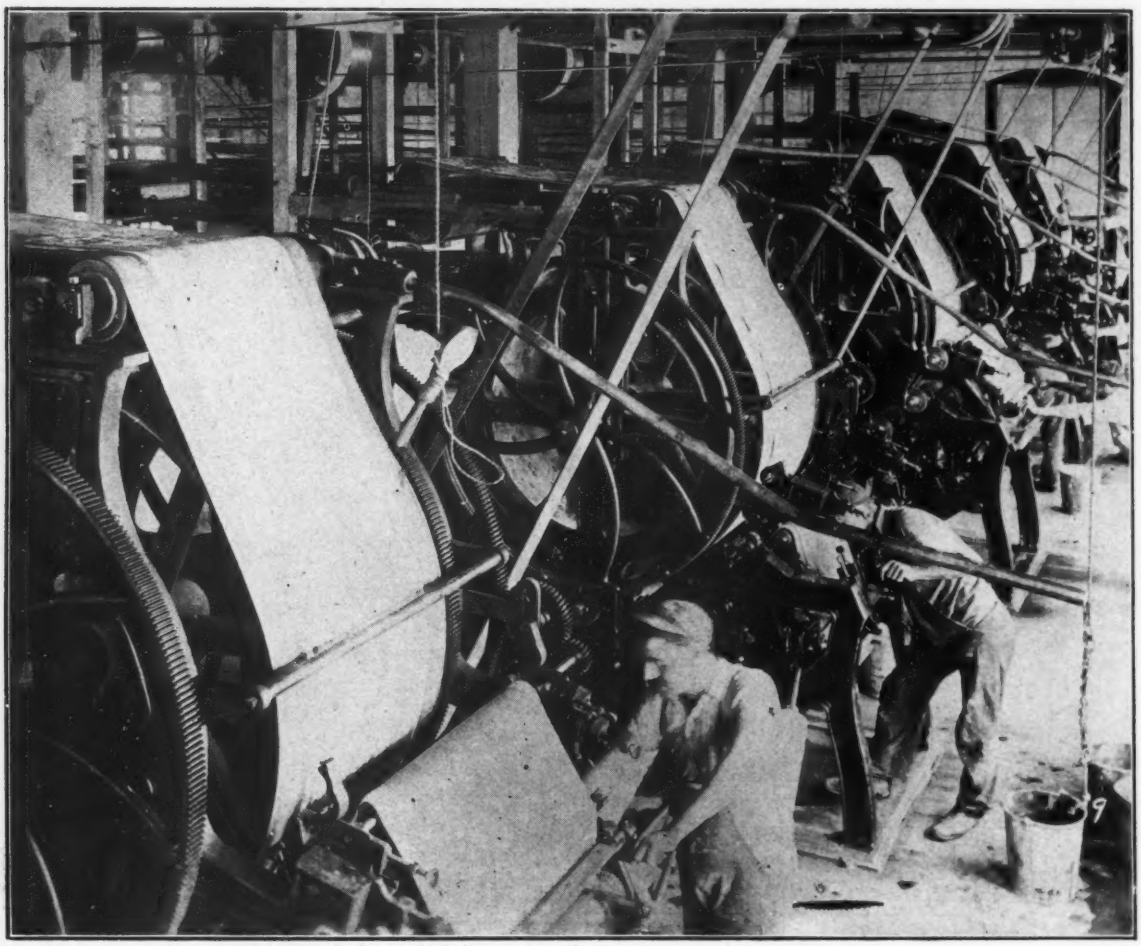
After traveling for some years, he became managing partner of Carey Brothers, Philadelphia, wall paper manufacturers, remaining in that position for a number of years. Later, he established his own wall paper manufacturing plant in Philadelphia, which was later burned out. He then came to York, and secured a position as salesman for the York Card and Paper Company.

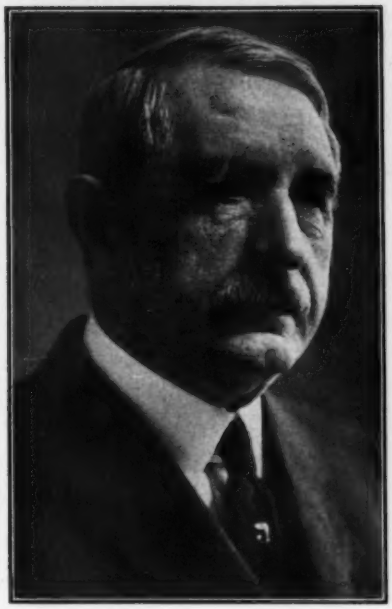
In 1915, Mr. Haffelfinger went to Hanover, where he started in the wall paper manufacturing business, establishing his plant on the site now occupied by the Revonah Spinning Mills, East Middle street. This plant was burned out in 1917. Mr. Haffelfinger then built a plant on Pine street, and continued the manufacture of wall paper. This plant also was burned out in 1919. He rebuilt the plant on the same site, erecting one of the most modern plants in the east. He continued the manufacture of wall paper until the Spring of 1937, when he sold his business to the late J. C. Eisenhart.

Mr. Heffelfinger died January 11, 1947. He was 87 years old.

Jacob C. Eisenhart, who purchased the wall paper manufacturing plant in Hanover from Everett R. Haffelfinger, first became connected with the manufacturing of wall paper October 9, 1894, when he accepted his first position with the York Card and Paper Company. He gradually rose until he became a director

Batteries of Machines to Make Old Time Wall Paper





Judge W. F. Bay Stewart
One of the founders of the York Card and Paper Company.

James H. Findley
President of the York Wall Paper Company from 1899 until 1919

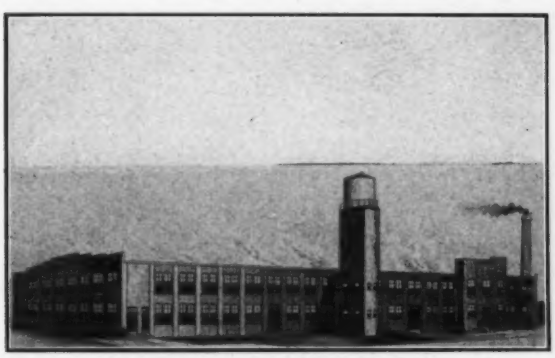
Earl Kegler
President of York Wall Paper Company from 1932 to 1936

Offices and Mill of United Wallpaper, Inc., About 1906

and general manager of that company. Later, a merger of several mills took place under the name of the United Wallpaper Factories, Inc., and he was elected a director, and made production manager of all United factories. He successfully operated the Hanover factory until his death, Dec. 8, 1946. Since his death the factory has been under the management of his widow, Mrs. Rosa Bott Eisenhart.

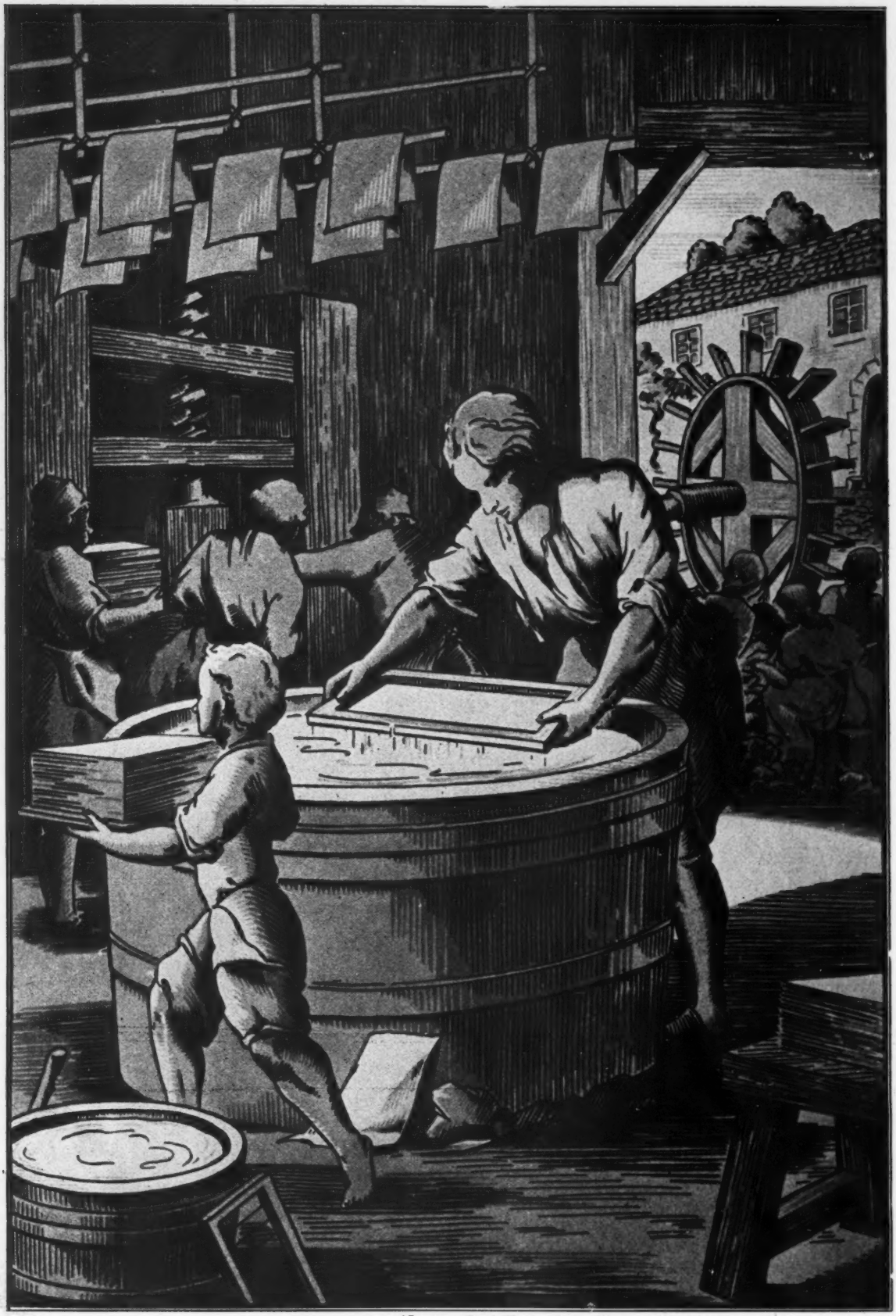
And it is an odd circumstance that, after centuries of wall paper production in the Orient, and in Europe, that American wall paper mills should be shipping so much wall paper to China, for instance (where wall or screen papers originated) and to such countries in Europe as were formerly so self sufficient in wall and decorative papers.

History of the industry appears to be that, although American homes welcomed the idea of wall "hangings" in early Colonial days, it was, indeed, some time before American mills could compete with European designs and production. But, when the time came to do so, in quantity, the American mills were usually able not only to compete, but to better the production of Europe, not only in price, but in quality.



Plant of the J. C. Eisenhart Wall Paper Company, Hanover, Pennsylvania

Plant of York Wall Paper Company, York, Pennsylvania, with office shown at right.



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Making Paper by Hand, As Drawn by a Modern Artist, Pichon

CHAPTER XXI

For More Than 1,000 Years Paper Products Have Expanded

MENTION the word "paper" to the average layman, and he immediately thinks of his newspaper, or the stuff on which he writes. If asked to call off a list of paper products, or name some article in which paper is a part of its manufacture, he will name you such things as books, newspapers, and writing materials.

Slowly, it will dawn upon him that there are such things too, as paper cups, paper matches, boxes, and cartons. And, if given plenty of time, he will generally get around to naming a few more items, such as toilet paper, cleansing tissue, paper bags, napkins, cigarette papers, building papers, and the like. Articles, only, of which he is familiar.

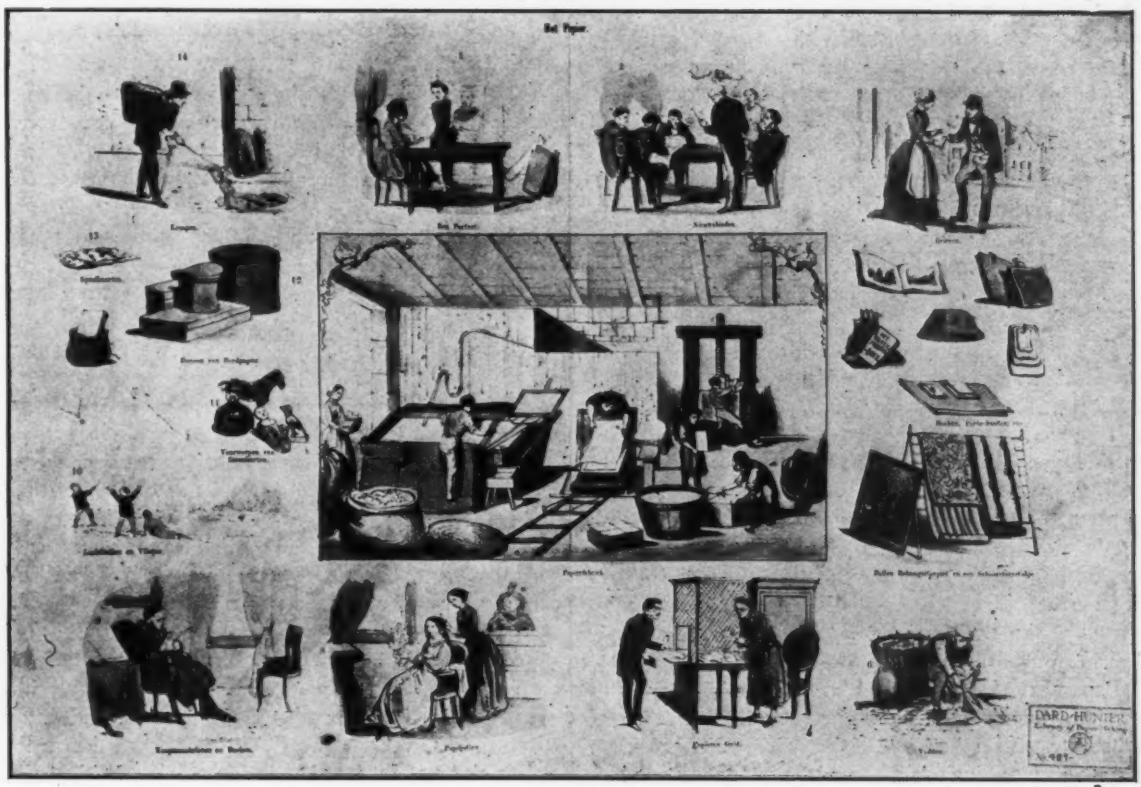
Yet, if the truth were known, he should be able to name off, quickly, hundreds of other items. The reason he doesn't is plain. Simply stated, it is this: Products of pulp and paper so surround us today that they have become commonplace. So common, in fact, as to be taken for granted. Things which we see and use, but which we do not really see or feel.

For example, suppose we take time off and step into a grocery store. What do you see? Groceries, of course. But how are they put up? (This takes a little thought.) In cans. Oh, yes, and boxes. That's right, but let's look further. Let's look only for paper products. To your amazement, it will soon appear that all the goods in the store are wrapped, boxed, or put up in paper. And it is true.

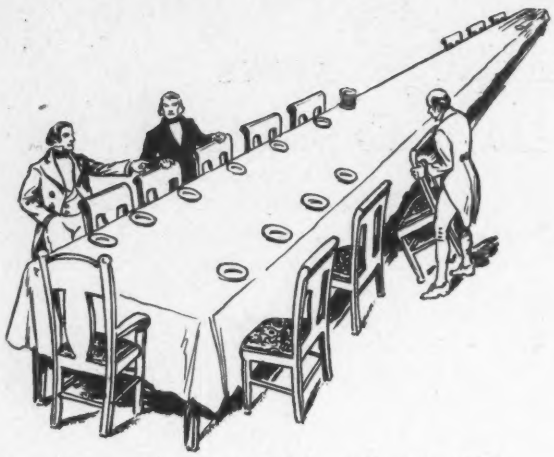
Yet, these are but a few of the thousands of paper products that surround us. The same picture can be

125-Year Old Lithograph of Paper Products

A colored lithograph depicting the making of paper about the year 1820, and the numerous uses of paper in the home, office, and by merchants for the making of hat boxes, lamp shades, toys, kites, etc. This is one of the dozens of prints that have been assembled, so that the Paper Museum collection would be as extensive as possible, giving every phase of papermaking previous to the introduction of the Fourdrinier paper-machine.



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)



Paper Table Cloth 125 by 5 Feet in 1833

found in your drug store, the restaurant, the 5 and 10. In fact, in a majority of the business houses you may enter. Even in the home, the office, the schools, the church, the hospitals, we are surrounded by items of paper.

It might even be said that the largest percentage of the paper and paperboard manufactured in the United States today is being converted into such products as boxes, containers, wrappings, and household supplies.

Manufacture of these items attained importance in this country immediately following the Civil War, or in what is known as the beginning of the Paper Era. From that time on their commercial uses have become tremendous, and ever increasing. In many instances, paper products have displaced such things as cloth, glass, metal, and many other materials.

Importance of the demand for the incidental items of paper manufacture has caused even the pulp and paper industry to show a tendency, in recent years, to combine the manufacture of paper products with the manufacture of their own primary items—pulp and paper. For after all, the manufacture of paper products is actually a job for the finishing section of the mills themselves.

Converting industries, as we know them now, are quite different from those of the primary, or basic industry, of pulp and paper. Machinery required is relatively simple; consequently, investments necessary to this type of manufacture are not great.

Field covered by paper specialties and converted paper products is unusually large, and includes a multitude of essentially different items. Their only common characteristic is the raw material from which they are made. Competition in this field is unusually intense. Annually, the industry employes aproximately 136,400 wage earners.

Papers used are classed as mechanical, or conversion papers. As such, they are used chiefly as substitutes for other materials. Generally speaking, they fall into four large grade groups: Wrapping, paperboards, tissues, and miscellaneous.

Up till now, no effort has ever been made by the industry, or anyone else, to classify or present the many and varied paper products in historical fashion. Nor do we here propose to do so. To attempt any such thing would be like taking a complete paper inventory.

The following then, is but a brief, sketchy bit on the history of a few of the more familiar items. It's first use, of course, was for conveying messages. Shortly thereafter, the ancient Chinese began using paper as money, in lieu of metal coins. While paper money might not be considered a paper product, it does signify the first movement of paper in the direction of other uses than that of conveying messages.

First instance in which paper was used as a paper product was recorded in the year 875, A.D. Then it was that Arab travelers reported having seen toilet paper in use in China.

Of our modern day paper products, playing cards number among the very oldest. Their's is an ancient history, so ancient, in fact, that the trails have grown dim. The very earliest mention of playing cards was made in China, where it is said they were used as early as the year 969. Legends, however, would have you believe that they were also invented in India.

At any rate, it can be reported fairly accurately that cards were first introduced in Europe in the fourteenth century, and, from there, they came to this country with the first white man. Due to the fact there were no paper mills in this country until late in the 17th century, what cards we had, prior to that, were imported. But, with the first of the paper mills set up in this country there also came into manufacture the first of our own manufactured cards.

In those early years playing cards had no designs on their backs. As a result, they were often used as calling cards and invitations. This custom came to an end in 1767, when an English patent, pertaining to the decoration of playing cards, was issued. The backs, from then on, carried flowered colorings, resembling, somewhat, our modern decks.

Since that time there have been ninety manufacturers of playing cards in this country. Today, there are but a handful. The United States Playing Card Company, at Cincinnati, Ohio, dominates the field. Altogether, the annual product of the card making companies amounts to 25,000,000.

Swinging on down the line of paper products we find that the next of our paper items came to us from Cairo, in the year 1035. In that year, wrapping papers received mention. The history, origin, and manufacture of these are a story in itself, and is told elsewhere in these pages. The same is true of blotting papers, wallpapers, and the extra thin paper, which came to us in the years 1465, 1550, and 1570, respectively.

A minor, but important paper product—to the children, that is—is the paper kite. Kite flying came to us from the Greeks, who, 4 centuries B.C., learned to make them of reed and other materials. With the advent of paper, kite flying grew in national importance,

and in China and Russia it has become a national pass-time.

Ben Franklin used a kite to a good purpose, as does the weatherman of today. Men of the ages built their own, but now we buy them already made at prices from 10 cents to $1,000. Box kites, used by the armed forces during the war, cost as much as $1,200. Most of the kites today are made of brown paper, colored tissue, cellophane, or old cloth rags.

To King Gustavus Adolphus, of Sweden, is credited the first use of paper cartridges. That was back in the year 1630. Artists, today, use a similar paper for certain kinds of drawings, because of its heavy wax-like texture.

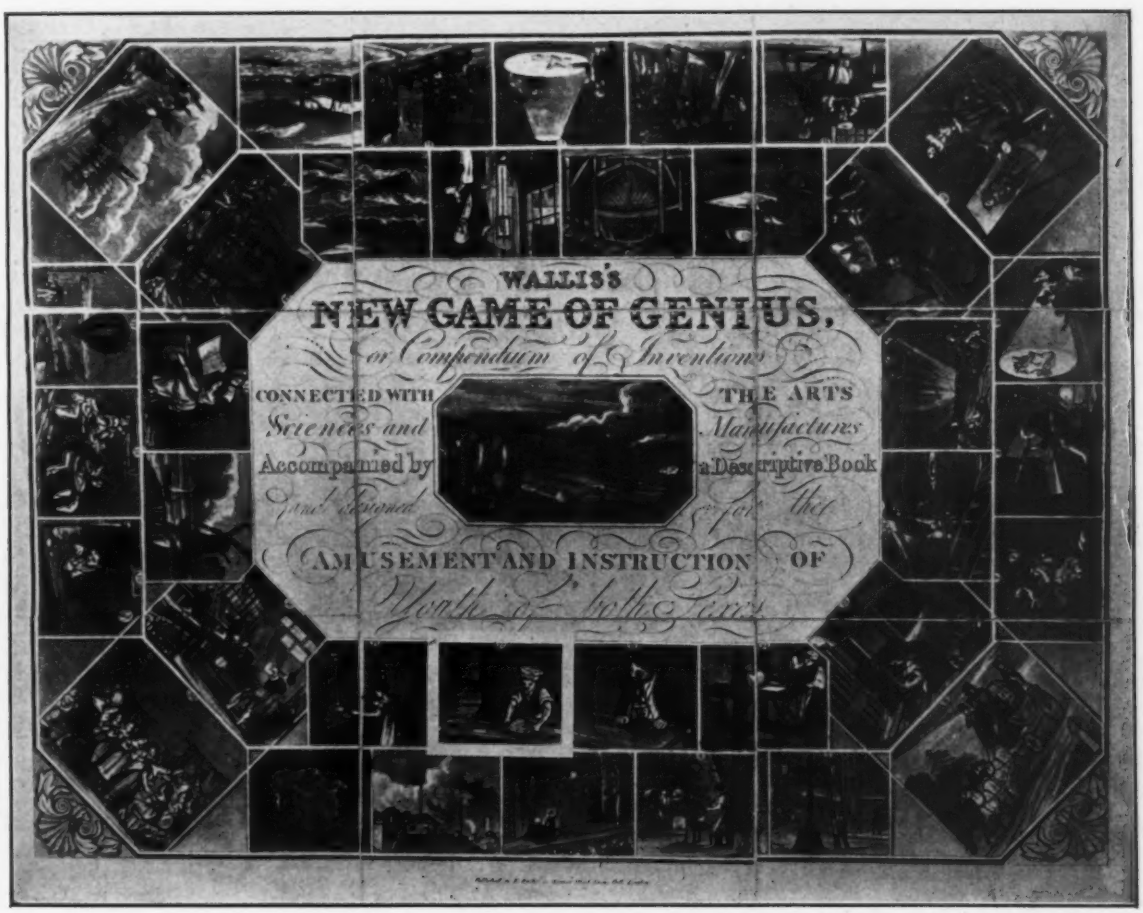
Paper cartridges, while not a modern product, were used extensively in the 16th, 17th, and 18th centuries. Were it not for them, this country might not have fared so well in the Revolutionary period, nor would there have been a Sepoy Mutiny in India in the year 1857. The latter affair came about because of the Hindu's religious scruples in regard to the eating of fats or greases. Paper cartridges, at that time, were made of strong, greased, light-colored paper, wrapped tightly around gun-powder. Cartridges, when used, were broken, the powder inside the paper capsule was dropped inside the gun barrel, and packed in with the greased paper, which was wadded in afterwards.

Native troops, once they learned of the grease in the paper cartridges, refused to touch them. As a result, they were imprisoned by the English. Other native troops, exasperated at this action, mutined, freed the prisoners, and massacred hundreds of Europeans.

From the 17th century on, paper has often been mentioned as a building material. It is still used as such today, and few homes go up without it. Its first uses in this capacity were made in 1772, in the building of coaches, sedan chairs, cabinets, bookcases, screens, and so on.

An Early 19th Century Game Label, Illustrating Handmade Paper Making

The Paper Museum of M. I. T. has endeavored to produce every existing print, showing the craft of papermaking as it was practiced previous to the introduction of the paper-machine. This early nineteenth century game, produced by lithography, hand colored, gives some idea of the extent to which this procedure has been carried out. The papermaker, standing at his vat, may be seen in the lower group of trades, second from the left in the upper row. Even the most insignificant pictures have been assembled, although, in many instances, the technical value is trivial and unimportant.



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

(Courtesy, The Dennison Manufacturing Company)

Original Dennison Factory Was A Home

However, these first building papers did not receive their full import until after the Civil War, or the year 1869. Then, they were used commercially as roofing and building material. An Englishman, Charles Lewis Ducrest, is credited with the first patent on building papers.

It was also in 1772 that Dr. Jacob Christian Schaeffer, a clergyman-papermaker, of England, began the weaving of paper into serviceable lace and cloth.

This led to the production of other things in 1829, when Joseph Michel Montgolifier, famed French papermaker, introduced paper table cloths and paper hangings, with embossed designs. While our paper table clothes of today may not resemble Montgolifier's fancy affairs, they do serve us in satisfactory fashion. Put up singly, or in matched tableware sets, we use them extensively for luncheons, parties, birthdays, and picnics.

Perhaps the largest single item or paper product, man has ever attempted to create, was made in the little town of Hop, near Bergen, Norway. There, in 1793, Cancellieraad Christie built a church entirely of paper.

His building materials consisted of papier-mâché, soaked in vitriol water, and then mixed with lime, treated with curdled milk and white of egg. Resultant pulpy material was used in the manner of plaster. The church, which was some 48 feet in diameter, with a seating capacity for 800, was destroyed in 1830, after some 37 years of service.

A similar project was again attempted in 1945, when an all-paper house was set up on the grounds of the Institute of Paper Chemistry, at Appleton, Wisconsin. This product, however, was purely a laboratory creation. Nevertheless, its commercial possibilities were seen, and there has since been some talk of commercial production.

In the year 1800, the manufacture of specialty papers received new impetus when it was reported that some 24,000 pieces of wallpaper were produced, as were similar quantities of fuller's board, cardboard, bonnet board, pasteboard, and others. Leading the field in this manufacture were the mills of Massachusetts.

In 1806, Francis Guy, of Baltimore, secured a patent for the manufacture of floor coverings composed of paper. According to claims made, the finished product was equal to the regulation product, at just half the price. Though never commercially successful at that time, Francis Guy's product proved to be a forerunner of a similar product being marketed successfully today; namely, craft fiber rugs.

Companies making these modern paper rugs carry approximately 100 different types and colors of twisting paper stock to produce a wide variety of fancy patterns. They are sold, chiefly, in leading department, furniture, and floor-covering stores thruout the United States, and also in Canada, Central, and South America.

Sandpaper, one of the most common items among our paper products, and which is used daily by many of our workers, was first produced commercially in 1830. Prior to that most workers made their own abrasive papers by coating ordinary canvas or heavy paper with glue, with a sprinkle of sand upon the surface.

In 1844, there entered into the manufacture of paper products a name we all know today, Dennison, manufacturer of a long line of paper products. It was in that year that Colonel Andrew Dennison, founder of the Dennison Manufacturing Company, at Brunswick, Maine, made the first of our commercial type of paper boxes for packaging. Since then the Dennison firm has brought forth many more of our modern every day paper specialties.

The Dennison Company attained its start in a plant consisting only of a work shed. Its first equipment was a cobbler's bench, and an assortment of cobbler's tools. These belonged to the Colonel, who was a shoemaker. Five years later a younger son, Eliphalet Whorf Dennison, joined the venture, which the Colonel and his older son, Aaron, had started, and it was he who brought forth the patented shipping tags, with the reinforced hole, in the year 1863.

The Dennisons worked hard, and, by constant improvement and diversification of their products, to fit specific needs, rapidly expanded their line of goods, and, by their efforts, set a standard for stationery sundries on counters thruout the nation today.

In speeding the growth of other industries, the inventor, too, was doing his part. From an average of 31 registered inventions per year in 1800, the number grew to an annual average of 2,500 in the decade ending in 1860. Such mechanical ingenuity and improvements in manufacturing processes lay behind the Dennisons, too. They developed machines to make their boxes. The first of these was set up in 1855 in a box making unit near Boston.

Commercial America, in this period, was still largely confined to the eastern seaboard. In fact, until 1848 the development of railroads had proceeded slowly. However, in the decades that followed, the railroads advanced rapidly. By 1860 there were over 30,626

miles of rails. No wonder the introduction of shipping tags was the next significant step in the development of the growing Dennison line. Story of Dennison merely parallels that of other industries of the time.

Movement to cities in 1846 was noticeable. In 1790, 3.3% of the population lived in cities; in 1840, 8.5%; in 1860, 16.1%. This population shift, of course, was due to the rise of business centers. And Dennison activities, in rural Brunswick, Maine, began to shift more and more to the vicinities of Boston and New York, altho some of the manufacturing operations continued to be carried on in Brunswick, until the scarcity of labor made them absolutely impractical.

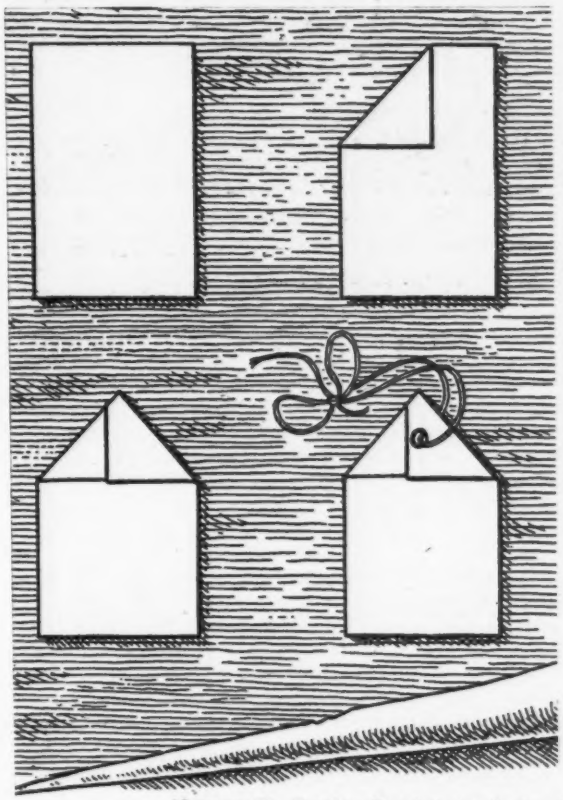
New York City, in fact, seemed to be the focal point of so much business activity that a Dennison office was opened there in 1855, the first of the 40 regional and sub-regional offices the company has in existence today. Boston, however, continued to be the headquarters of the steadily growing concern.

Now, at the start of its second century, there is hardly a phase of modern living in which the Dennison Company is not associated. Its products enter into all homes, and are used in every type of business.

During the war years, Dennison's role was that of a paper converter, the largest of its kind, geared to the war production of such oddities as paper parachutes, ordnance and shell boxes. Its peacetime products consist of such items as packing boxes, shipping tags, diaper liners, materials for making artificial flowers, transparent mending tape, gummed labels, index tabs, sealing wax, plastic ring cases, and cases covered with simulated leather, price tags and tickets, pinning

(Courtesy, The Dennison Manufacturing Company)

First Shipping Tags Were Cut Out by Boys, and by Hand



(Courtesy, The Dennison Manufacturing Company)

Paper Shipping Tags in 1844 Were Rather Crude

machines, dial-set printers, gummed papers, decalcomania papers, tissue, shelf paper, and crepe paper. To enumerate them all, one would have to list about 9,000 items of stationery sundries and jeweler's findings. Net sales of their products in 1946 totaled $21,648,920.

Forerunner of another of our present day paper products came into existence in 1850, when a fancy lace paper for valentines, cards, and envelopes were originated. Its use in this form remained in vogue 25 years. Today, however, we use it to produce such paper products as paper specialties, and many others.

It was also in the year 1850 that paper bags were made for the first time—then, entirely by hand. The first automatic paper bag making machines came into existence in 1876. Paper bag making industry is another of the paper products we know that has a story of its own. Therefore, it is told elsewhere in these pages. Products in this field are many and varied, and, in the year 1941, the industry produced better than 50,000,000,000 bags of varied size.

It is interesting to note, however, the specialties in this field, and record a bit of their history. Glassine bags, now so popular with the housewife and the professional and amateur photographer, came into prominence at about 1926. Oneida Paper Products Company, New York City, just getting a start in life, centered its interests on this type of bag.

Quick to note its weak spots, chiefly the bottom sealing, the company soon devised a machine which

(Courtesy, The Dennison Manufacturing Company)

Tags, Tags, Tags,—Paper Makes 'Em

placed a golden cellophane reinforcement patch on the bottom of the satchel bottom type bag. Thus was born Ful-Lok, one of Oneida's specialty bags. Others to follow it were Titelok, Flav-o-Fresh, and the most recent of the lot, Sta-Fresh.

In the specialty bag field it may safely be said that sandwich bags are the best selling of the products.

After a few very difficult years, the sale of these bags, thru the grocery channels, finally caught on. Today, they rank alongside such other products as paper towels and toilet tissues in the matter of sales.

Paper tea bags are another specialty that have found great use in the past few years. Manufactured by many of the tea companies themselves, they are made in various sizes and shapes for commercial consumption. Even when wet the bags remain strong, permeable to liquids, and impassive to solids.

Paper twine is another product which is constantly gaining in favor. First made in America in 1862, it is now replacing such other items as sisal, jute, and cotton twine. Woodtwine, for tying bales of wool; seating cord, a heavy twin for weaving chair seats; garden twine, for stringing beans and peas; and a heavy twine, for stringing hops, are among the paper twines manufactured in large quantities. Annually, the equivalent of 57 carloads of paper are converted to the manufacture of this product.

Employment of paper as greeting cards, to express our feelings and emotions to one another, has created one of the largest of the businesses in the paper products field. First used a little over a 100 years ago, their manufacture and sales today run well into the millions.

First of our Christmas cards came to us from William Maw, an English etcher, in 1842, but they were not generally accepted in this country until 1860. Valentine greetings date back even farther than that—to the Middle Ages, to be exact.

Early American history of the greeting card centers around Louis Prang, an exiled German, who came to this country in 1846. Settling in Boston, he soon thereafter set up a small lithographic business in which he produced, in 1865, lithographic prints of oil paintings. From these he developed the idea of multicolored Christmas cards. In the early 70's he published a deluxe edition of the cards, and immediately found a ready market, both in this country and in England.

Thru the years, between 1890 and 1906, there was a marked decline in the sale of Christmas cards, but, after that, new life came to them, and from it, tremendously large sales figures. Wholesale sales in 1945 amounted to over $70,000,000. Individual units produced last year totaled 3 billion.

In that business there are employed some 23,000 people, 3,000 of whom are recognized as salesmen. In addition to these, there are upwards 500,000 part-time representatives who act as sellers.

Turning the page we find that, even in the tobacco business, many paper items are used. American Tobacco Company, for example, buys paper products from many firms and many different lines. Tobacco, itself, in its waste form, has been used in the manufacture of paper. This is evidenced by the fact that the first cigarette paper, to be made, came from the fiber of the tobacco plant itself.

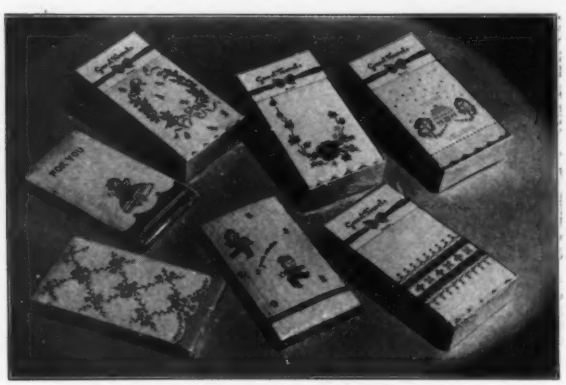
Early in 1845, John Adcock obtained an English patent for the use of tobacco in the making of paper to be used in wrapping cigars. Today, many of the larger tobacco companies use paper products in such form as wrappers, cases for cigarettes, tobacco bags, cigar packs, and cigarette paper booklets. If the truth were known, it would soon be found that many of the tobacco companies themselves are today the owners of many of our largest tissue mills.

By 1868, paper was being converted into articles for almost every conceivable purposes—boxes, cups, collars, cuffs, corsets, barrels, buttons, plates, wash-bowls, hats, handkerchiefs, table tops, window blinds, roofing material, aprons, towels, vests, napkins, shirt-bosoms, raincoats, slippers, curtains, petticoats, carpets and a host of other things.

In fact, articles of paper became so commonly used during the period, a song, entitled, "The Age of Paper," was written and sung in London music halls. One man, Howard Paul, popularized the song by appearing in a paper suit as he sang.

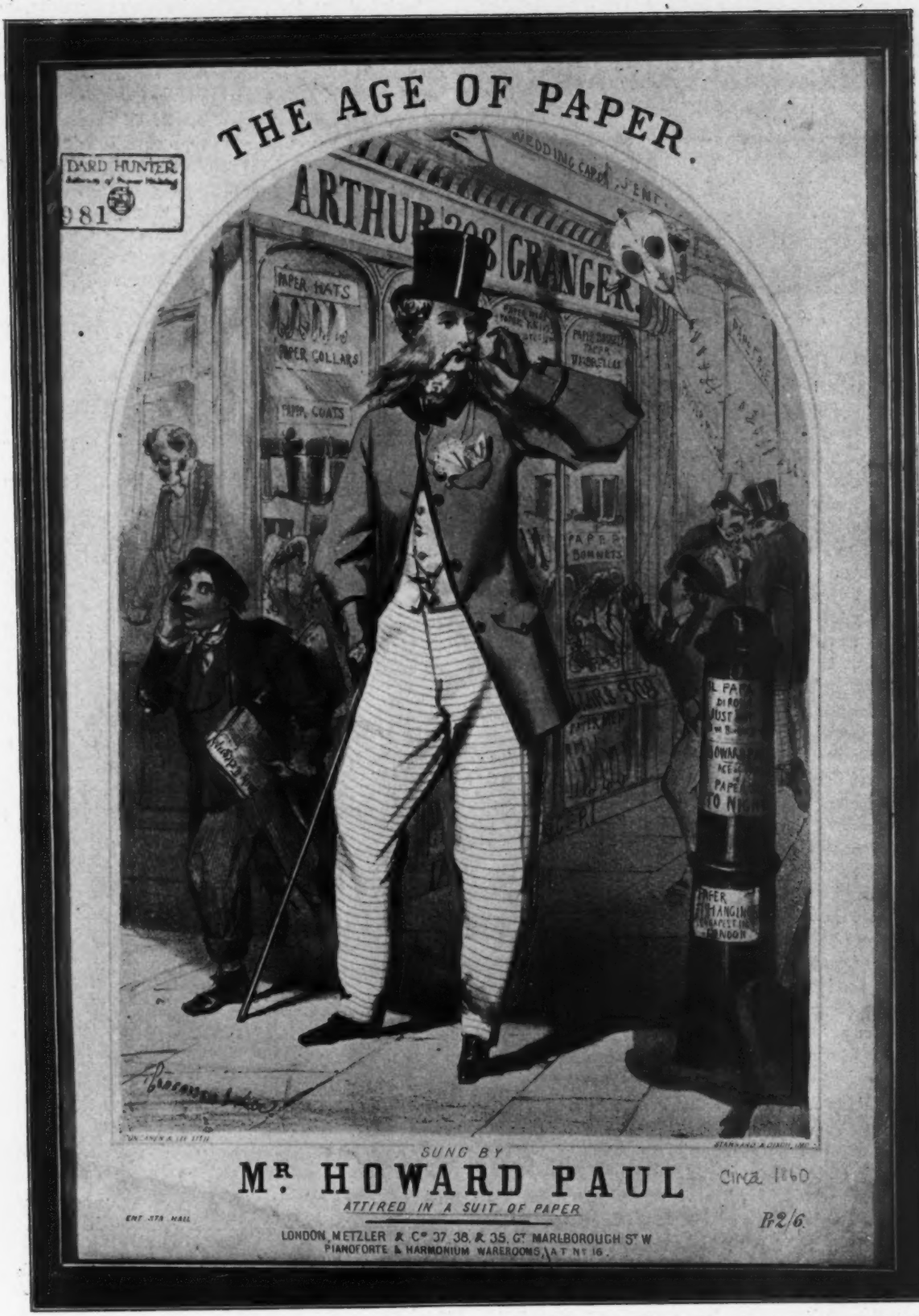
Perhaps the most unusual of the paper products in that period were the paper coffins, made of heavy laminated papers. These were designed and manufactured by M. Szelemey, who was the inventor of many paper products.

It was also in this period that toilet paper was first



(Courtesy, The Dennison Manufacturing Company)

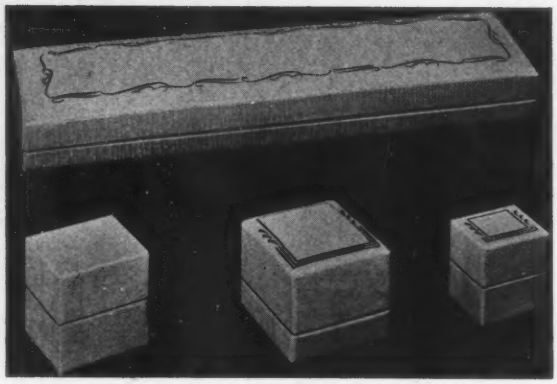
Guest Towels of Paper



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Everything in Paper

During 1860, Howard Paul in London music halls appeared "attired in a suit of paper," and gave his song.



(Courtesy, The Dennison Manufacturing Company)

Jewelry Boxes of A Paper Base

put up in roll form. However, its use in this form was not commercially successful until 1899, when it was universally accepted. Today, we consume annually over 300,000 tons of paper put up in this form, and there are approximately 100 different manufacturers who give it to us. Scott Paper Company, at Chester, Pennsylvania, and the Hudson Pulp & Paper Corporation, of New York City, are probably the two best known.

In the early 60's of the 19th century there came into the manufacturing business an odd, but interesting paper product. Paper car wheels. These were manufactured at Brandon, Vermont, by Richard N. Allen, their inventor. They were first used on the Central Vermont Railway, and then, later, by the Pullman Car Company, who placed an order for 100 of the wheels with the inventor. Ten years latter the Allen Paper Car Wheel Company, at Hudson, New York, produced tin one year 13,000 paper wheels. Of these, one set is supposed to have traveled over 300,000 miles.

If we could sail away to China and Japan, we would see some still stranger uses of paper. We would see people carrying paper parasols in the rain and wearing paper raincoats. We would see them tossing paper balloons and flying paper kites, and many of them would be found living in paper homes. It was in 1895 that we received from these people the first of our plain and decorated paper napkins. Today, there are over 50 manufacturers of this product in this country. Sales of the napkins have increased with the years, and the universal demand for them is great.

Three years before the advent of napkins in this country Joshua Pusey, a patent attorney, of Philadelphia, Pennsylvania, conceived the idea of paper matches. Toying with the idea for several months, he finally found a piece of flexible cardboard, which he cut into strips and dipped into a match composition of his own manufacture. And, from there on out, a new industry was born— the book match industry.

With the birth of that industry, we can record too, in the history of paper, another of the more important uses for paper. Likewise, another industry made possible because of paper.

Book matches, today, are big business. Annually, the match industry turns out 500 billion matches. Of these, 200 billion are book matches, or paper matches. And, of the 200 billion book matches, which are manufactured annually, all but 2 per cent are given away "free" to consumers thru many channels. Broken down to sub-box car figures, this gift represents 20 million free matches per hour, day in and day out, or a total of over 26,000 tons of paper.

Although the Diamond Match Company, of New York City, took over the first patents on the paper matches, the Universal Match Corporation, at St. Louis, Missouri, is today the largest of the book match manufacturers in this country, and it can be said, the world. Universal, by the way, is also a manufacturer of many candy bars, and the paper that wraps them.

Today, there are but nine corporations listed as manufacturers of paper matches. Nevertheless, the value of their combined products reached a figure of 50 million dollars in 1940. It is a highly competitive field.

Numbering among the other great industries founded on the converted use of paper is the paper cup industry. This industry's history dates back to 1907, when an obscure school teacher presented a cornucopia-shaped paper cup to the world. Since that time the paper cup industry has come far. From the production of that first simple, little, water cup, this industry has advanced to a point where it now produces a long list of diversified items.

Rapid growth of the paper cup industry has been due, no doubt, to public need and demand. Once placed on the market commercially, the paper cup was quickly recognized for its worth and beneficial uses. Its sanitary facilities are of even greater value. As stated, the cups received their start in the year 1907. It was that year that Dr. Samuel J. Crumbine, in the State of Kansas, carried on a one man crusade against the public drinking cup. As a result of his agitation there was forced thru the Kansas State legislature, two years later, a bill abolishing the old tin cup. The movement was quickly followed by other States, and soon the same sort of legislation became universal.

It wasn't, however, until after the good doctor had won his first ground that the school teacher met him, and showed him the cornucopia-shaped cup he had fashioned out of paper. This, he pointed out, when used, could be crushed and thrown away.

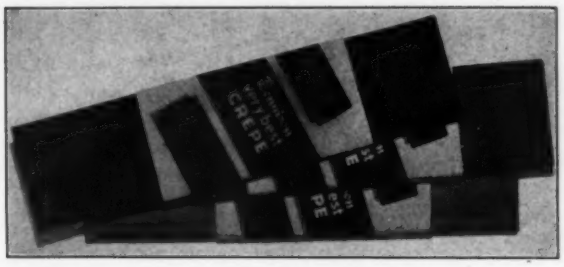
Conversation that followed gave rise to the paper cup industry.

Although there are many kinds of cups on the market, there are but four basic types being manufactured. *(1)* The cold drink cup, *(2)* The hot drink cup, *(3)* Containers with lids, and *(4)* The dishes and souffles.

Briefly, a few of the manufacturers in this field, are: Miro Paper Products Corporation, Brooklyn, New York; Milwaukee Lace Paper Products Company, Milwaukee, Wisconsin (established in 1898); Boston Drinking Cup Company, Dedham, Massachu--

setts; Beach Products, Inc., Kalamazoo, Michigan; Lily-Tulip Cup Corporation, New York.

Probably the largest single supplier of paper to the paper cup industry is the Mead Corporation, one of the largest pulp and paper manufacturers of this country. Founded in 1846 in Chillicothe, Ohio, this large concern now grosses a plant value of over $47,000,000 from 16 different mills in 8 different States.



(Courtesy, The Dennison Manufacturing Company)

Crepe Paper, Used for Decoration and Display

All thru the ages, industrial chemists have sought to better paper productions. An example of this type of paper conversion, and the research back of it, is the development of the new paper fruit wraps. Habit of wrapping fruit for preservation was acquired in 1910, when apples were first wrapped in a specially treated oil paper, to prevent "scald." Today, tissue paper wraps are manufactured by the millions.

Chief function of any fruit tissue is to insure delivery of fruit in a condition as nearly perfect as when it left the packing house, no matter how distant the market. By their work, researchers have perfected a copperized tissue, which, when used in wrapping papers for late season pears, save them from botrytis rot while in storage or in transit. A similar fruit wrap has been developed for the citrus growers.

Today, paper draperies are finding a wide use in our homes, and, as a result, are replacing many other expensive items in this field. At a distance, the heavy-quality paper-like fabric, used in the new drapes, looks as soft and pliable as any of the finer goods usually made into drapes. What is more important, is their low cost, which allows for replacement, from year to year, thus eliminating expenditures for cleaning and laundering.

Drapes, made of paper, were first used in this country at the beginning of the Paper Area. But they were not generally accepted by the public until 1937, when the Dennison Manufacturing Company produced a paper drape that found a rather small market.

Dennison Company, however, did not stay in this field long. Business was taken over by the Pervel Corporation, at Elizabeth, New Jersey, which made further improvements. These were followed by still other improvements in the manufacture of a base cellulose material and its chemical treatment, which improved considerably the quality and workability of the old type paper drapes.

There are now a number of companies engaged in the manufacture of this material. A short list of them follows: Wallscott Products, Inc., Fitchburg, Massachusetts; Clopay, Cincinnati, Ohio; Carol Draperies, New York; Ben-Mont, Bennington, Vermont; Steiner Manufacturing Company, Pittsburgh, Pennsylvania; Trimz (Division of United Wallpaper Company.)

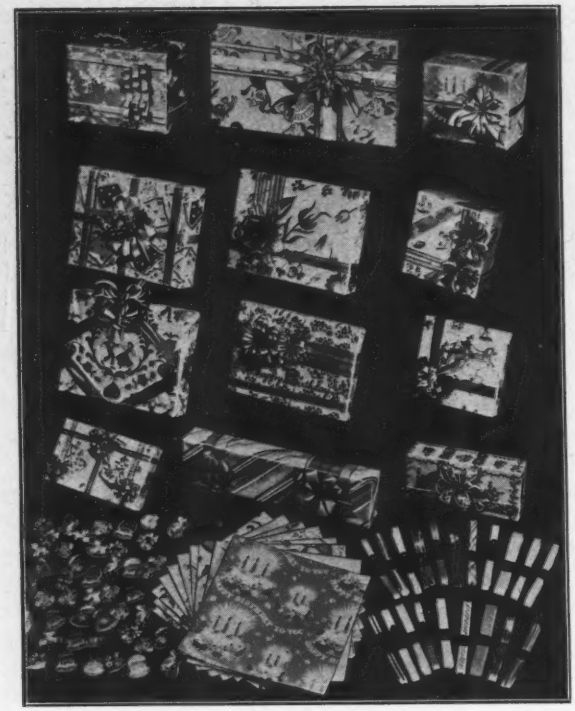
Wallscott Products, Inc., at Fitchburg, Massachusetts, is probably the youngest of the manufacturers in this field. Their products, however, the Decolure drapes and cottage sets, would indicate they are going far. Clopay firm is well known for the manufacture of such other products as paper window shades and venetian blinds.

A product of relatively recent origin is cellulose wadding, or artificial wadding. Cleansing tissue, barber's neckbands, sanitary napkins, babies diapers, surgical dressing, and similar products, where high absorptive quality or extreme softness is desired, are often made of this base stock. Its development came with World War I. Demands on cotton became heavier then than ever, and, as a result, a search was instituted for a cotton substitute. Cellulose wadding was the answer. From it, surgical dressings of "paper" were made as early as 1918.

In 1920, just following the war, a well-known paper-manufacturing company placed on the market facial tissues, and sanitary napkins, consisting of a wrapper of sterilized cotton gauze around a filler of cellulose wadding. Both of these products proved immensely popular. From this as a starting point, the use of cellulose wadding was extended to a great many other uses, such as diaper linings, candy pads, and handkerchiefs. Recently, this material, in the form of crepe wadding, has been used as a protective padding for

(Courtesy, The Dennison Manufacturing Company)

First Tissue Crepe Paper Was Just a "Mistake"



(Courtesy, The Dennison Manufacturing Company)

Giftwrap Papers for Fancy Boxes and Packages

fine furniture, and as packing material for a large variety of products where protection from scratching and breakage or changes in temperature, is essential.

Facial tissues were originally presented as a cosmetic accessory, but, today, they are more widely used as handkerchiefs. Once considered as an item to be sold thru drug stores, facial tissues now enjoy a wide display and sale thru many retail and variety store outlets. Probably the oldest and largest single supplier of this product, and many others, is the International Cellucotton Products Company, at Chicago, Illinois.

In the converting field there are but few companies much larger than that of the Kalamazoo Vegetable Parchment Company, at Kalamazoo, Michigan. One reason KVP is so large is because it converts most of its paper into the making of over 200 different items. These, if variations of size, grade, and color are considered, would number nearly 10,000.

Founded in 1909 by the late Jacob Kindleberger, this great company now claims, as its special mission in the world, the protection of the nation's food. Bread, butter, meats, fish, cereals, vegetables, candy, and many other essential items, reach us each day fresh, safe, and clean, because of the paper made by this concern.

Oldest of our present day parchment paper manufacturers is the Paterson Parchment Company, at Bristol, Pennsylvania. It is from such companies as these that we get our waxed, greaseproof and household specialty papers. West Carrollton Parchment Company is also a large concern.

In 1944, James H. Muse, Bridgeport, Connecticut, applied for a patent on a new paper product, which is only now reaching the market. This is the new soap sheets, which are fast becoming a welcome addition in the majority of homes. They may soon be as indispensable as the paper guest towels in the bathroom, and rolls of paper toweling in the kitchen.

Others of our more recently designed paper products include such things as phonograph cabinets, made of molded pulp; covering for electrical outlets; mail boxes; and weatherstripping. A boon to theater-goers should be the new noiseless paper bag just recently marketed by the American Paper Bag Company, of Chicago. It is said to be non-cracking and non-rustling.

For use with recording equipment, a new magnetic paper tape has been developed. According to the Indiana Steel Products Company, of Chicago and Valparaiso, Illinois, making it, the new tape is expected to supplant or replace wire, now being used for similar equipment. Paper used is a strong fiber type, described as oriented fiber. Actually, it is rope paper.

Wash cloths, made of paper, are finding a ready market in leading hotels, homes, and elsewhere. This item, not affected by boiling, is used to wash dishes, windows, enamelware, waxing floors.

Among the less glamorous new paper products of the wood fiber type are garbage containers, wastebaskets, and sink strainers. These items, with the exception of wastebaskets, are waterproofed in the manufacturing process.

Needs of the "small fry" in the home have never been forgotten by the manufacturers of paper products, in their constant quest for new types of useful items. For them, the small fry, we have such things as baby bibs of waterproofed and plasticized paper; disposable diapers; sanitary toilet-seat covers; and a long list of paper toys and cut-outs.

Other items consumers have been using in their homes for many years, include baking cups, milk containers, bottle caps, lamp shades, window shades, egg crates, and cartons, butter cartons, artificial flowers, artifical leather, paper straws, paper bath mats, paper blankets, paper cans, caps, coasters, cocktail and beer mats, coffee filters, place mats, paper dress shields, dusting papers, fly paper, gummed paper, shelf paper, matched tableware sets, and others not mentioned.

It is doubtful if there is any one living today who can list the entire roster of paper products. Neither is there any one who can tell you of the history and origin of the majority of the items. Not even the manufacturers themselves know the history and origin back of many of the products they manufacture.

This is due, no doubt, to the fact that many of the early, original products failed to prove their worth. As a result, manufacturers dropped the failures and took on new. On the other hand, there came along other manufacturers, who picked up the failures, and, by new patented processes and improvements, developed them into the products of today.

CHAPTER XXII

Advertising of Paper Products A Matter of Quality, Service

FOR the most part, the story of paper products advertising, down through the years, has been a script authored by a handful of progressive pioneers, particularly those mills and companies identified with the printing and writing papers production branch of one of the nation's oldest and most important industries.

On this, the 75th anniversary of one of the industry's foremost publications . . . in fact, a pioneer itself in serving mills without interruption . . . it is particularly significant and timely to highlight some of the outstanding achievements and notable efforts made by certain manufacturers in the advertising of their products.

It would be no exaggeration to say that their work, as represented in space advertisements and sales promotion pieces, has done the lion's share of forging the style, tempering the tone, and setting the pace for others to emulate and follow, as well as serving as exemplary inspiration to still greater and more effective advertising endeavors.

From the crucible of their early experiences and subsequent efforts have poured advertising material and themes in great diversity, but which, by and large, have developed along three lines: (1) servicewise, (2) productwise, and (3) institutional prestige.

Playing a prominent part in the industry's early advertising brigade were, among others, such companies as the S. D. Warren Company, of Boston, Massachusetts; Hammermill Paper Company, of Erie, Pennsylvania; Strathmore Paper Company, of West Springfield, Massachusetts; Scott Paper Company, of Chester, Pennsylvania; and Crane & Company, Inc., of Dalton, Massachusetts.

Perhaps of greatest historical importance, and unquestionably of particular interest because of their effect on the scheme of things in the paper world, from the standpoint of effective advertising, are the programs which have been carried on by S. D. Warren and Hammermill . . . each independently and intensely competitive, of course, a vigorous, yet healthy, stimulating rivalry that has benefited the entire industry.

Manufacturers of quality printing papers, S. D. Warren has been advertising its standard mill brands on a national scale for 37 years, unquestionably making this organization one of the paper industry's pacesetting advertising pioneers. In fact, this organization, along with the Scott Paper Company, both started in 1910, are believed to be the first paper manufacturers to advertise in The Saturday Evening Post. At least they are the first names recognized by one eminent authority as those of paper mills. These two concerns were preceded by the Dennison Manufacturing Company, of Framingham, Massachusetts, producers of crepe, tissue and grease proof papers, who, according to a listing issued by the Post, first advertised in that magazine in 1905. In 1912, Hammermill first appeared in that publication.

One executive, whose experience in the industry dates back to these early days, comprehends that the Post is but one of a number of media, and adds that, undoubtedly, paper mills advertised in trade publications much earlier, and mills, most certainly, must have issued sample pieces earlier. But it appears, on excellent authority, that Warren, Hammermill, and Strathmore are the three mills which first sponsored completely coordinated advertising programs. It is quite probable, also, that their first appearances in the Post mark the inaugural date of their publication advertising.

S. D. Warren Company was founded in 1854 by Samuel Dennis Warren, who purchased a small paper mill located at Cumberland Mills, which is now a part of the City of Westbrook, Maryland. At first, the mill manufactured paper from rags. Later, pulp mills were erected for the production of wood pulp.

Upon acquiring a small mill at Gardiner, Maryland, in 1863, Warren converted it for the manufacture of Bible or India paper, which had not then been made in America, but had been imported here from England.

Cumberland Mills grew and prospered by serving book and magazine publishers. In the early 1900's, it supplied the paper requirements for Munsey's, Scribner's, Collier's, Youth's Companion, Century, and other leading magazines of the period. In addition, it served leading publishers of school and trade books . . . J. & C. Merriam, Ginn & Company, Allyn & Bacon, American Book Company, Houghton-Mifflin . . . to cite a few representative examples. In 1917, Warren then defined a merchandising policy that was both new for the company, and unique in the fine paper industry.

To put it specifically, this distinctive progressive policy called for a line of coded and uncoded book papers, to be made to mill standards, to be sold through the paper merchandising industry in all major cities, to be priced alike to all merchants, and to be advertised through the media of printed literature (booklets, folders, bulletins), and through paid space in magazines.

Moreover, the policy specified that the advertising,

Cameo Results are Paying Results
CAMEO
PLATE
Coated Book—White or Sepia
S. D. Warren & Co., 161 Devonshire St., Boston, Mass.
Manufacturers of the Best in Staple Lines of Coated and Uncoated Book Papers

(Courtesy, S. D. Warren Company)

A 1911 'Ad' for Paper

instead of making claims and asserting advantages of Warren products over those supplied by competition, should be so designed as to render a constructive service to the paper merchandising industry, the printing field, and buyers of printing.

Originated three decades ago, that policy remains in effect today, and, as a full page advertisement in the May 2 issue of Printer's Ink attests, it is strictly adhered to. Captioned "Do You Need Help in Training Personnel in Advertising and Graphic Arts?", this advertisement offered, without cost or obligation, to enroll personnel of interested companies in a course by mail, designed to aid beginners in advertising, sales, or administration work.

The course consists of nine texts, especially prepared by the Warren organization for the orientation and guidance of young men and women entering the advertising profession and the graphic arts industry. These books constitute, the advertisement pointed out, a course of study that explains the economics of business and the function of printed literature as an aid to management; they describe the fundamentals of planning, writing, designing, producing, and circulating printed messages.

The company added: "It is not the purpose of these S. D. Warren texts to teach young people how to write, design, choose media, or deal with the mechanical end of the business. Their purpose is to define the relationship of the various advertising tasks, to describe the means by which they may be performed, and to explain the reasons for performing them."

Companies interested in enrolling any of their personnel in the course were requested to write the Warin Company, providing such information as the type of business engaged in, position in the company of the writer, and the names and mailing addresses of the individual trainees elected to receive this course of texts.

Unique feature of the plan is that complete sets of books are not mailed to enrollees at one time. To insure that subject matter is taken up in proper sequence, and to encourage thorough study, the books are mailed in consecutive order at two-week intervals. Under this arrangement, the course requires a study period of 18 weeks.

Titles of the nine texts comprising the Warren study course are: (1) Business —Its Nature and Its Functions; (2) Management—Its Functions and Responsibilities; (3) Management and Its Corporate Society; (4) Printing—The Essential Aid to Management; (5) Printing—Its Forms and Designations; (6) Printing—Types and Typography; (7) Printing —The Process of Reproduction; (8) Printing — Papers and Their Uses; (9) Mailing Lists and Regulations.

Warren's first magazine advertising, appearing in 1910 in The Saturday Evening Post, promoted a Warren brand paper named "Cameo." The company has advertised in this magazine ever since that time, and, in 1913, began advertising a line of printing papers for commercial printing. Following adoption of the 1917 policy, space advertisements sponsored by the company have been designed to explain how businesses can benefit through the utilization of printing.

A quick review of Warren's publication advertisements, ever since 1925, reveals themes dedicated to fully carrying out this proposition. In 1926, for example, the theme was "A Still Better Reception." Five years later, it was "Promoting the Use of More Printing." In 1943 the campaign was devoted to "Books—Essentials of Freedom."

The collection of Warren-originated promotional books, each of which is designed to be an instructive text, as indicated earlier, has met an enthusiastic reception from both producers and consumers of printing. Booklets, and date of publication are as follows:

1. Making It Easy To Plan Printing 1921
2. More business Series 1923
   (More Business through House Organs was part of the original series, has been revised and reprinted time and again and is currently available)
3. Workbook for Planning Printing(original edition) 1925
   (This has been reprinted frequently, and is currently available.)
4. Selling with the Help of Direct Advertising .. 1925
5. Estimators Book 1929
6. How Will It Print By Offset? 1942
7. Managing a War with the Help of Printing .. 1943
8. How to Plan Printing to Promote Business .. 1946

The company's booklets, on planning printing to promote business, have received widesperad recognition. Late last year, for example, Tide magazine commented that "the booklets should win for Warren a substantial number of new friends."

Hammermill's advertising efforts have been equally noteworthy. This company's first advertisement, to appear before the paper-consuming public, was in The Saturday Evening Post issue of May 11, 1912. It appeared soon after the introduction of Hammermill Bond on the market. Up until that time, Hammermill had supplied its products with private watermarks,

some 200 of them. Each customer got essentially the same paper, but each with his own mark, and some with more than one mark.

Effect of this merchandising system was that Hemmermill paper was competing with itself under different brand names, the country over. But that was not all. It is not difficult to imagine the production difficulties there were in those days of frequent machine changes, to make up individual orders for each of the 200 different watermarks.

To provide the efficiency in savings of greater production, it was recognized that there should be only one brand paper sold to all Hammermill customers. Also, as this one brand would be distributed on a nationwide basis, it was further recognized that it should be advertised, and the merchant-distributor's sales efforts should be backed up with sample books, mailing pieces, and the long-famous kits which Hammermill has supplied for these many years.

First advertisement—which was one-half page in The Saturday Evening Post —was a crude affair, in 1947's eyes. But it was in the style of its day, and it was the first of many thousands of advertisements that have appeared in this and other magazines in a campaign that has continued for 35 years, without a break—through good times and bad, and through two wars.

An interesting comment: This first advertisement lists 29 Hammermill distributors. Today, there are 148 Hammermill agents in 113 cities in the United States. And Hammermill products are distributed in more than 50 other countries around the globe.

To tell the complete story of the development of Hammermill advertising, from the small space and crude technique at the beginning, before World War I, to the advertisements of the present day, would require considerably more space than available here. Suffice to say, some anecdotes about the various advertisements, and about the reactions and responses these caused, prove interesting.

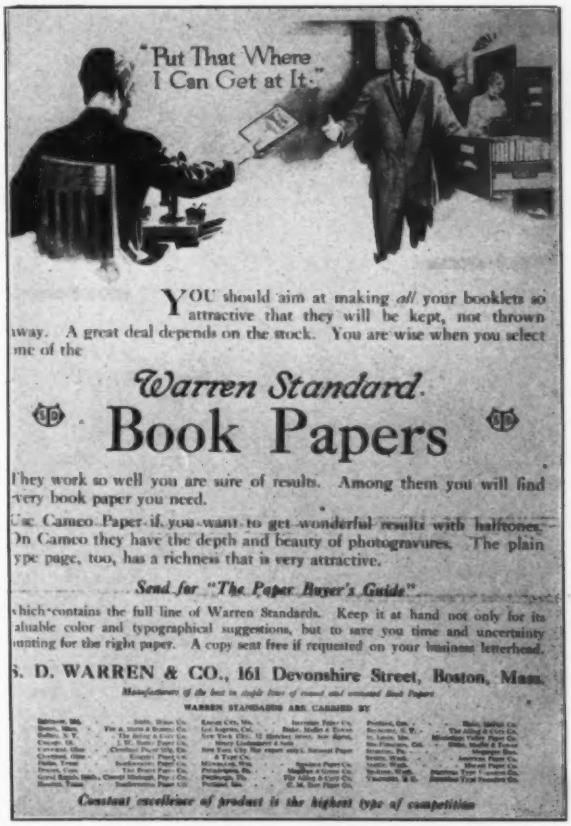
To compare today's advertising with that original 1912 effort, proofs of several 1947 Hammermill advertisements in The Saturday Evening Post are reproduced herewith. These are exactly the same size space as that first advertisement, but there the resemblance ends. In addition to their different appearance, note their different approach: Instead of talking about the product, 1947 ads talk to readers about the reader's office problems, and they offer those readers practical help to solve these problems. Mention of the product is confined to one small paragraph.

Books, offered in these, and other similar Hammermill ads, are from a series of 15 similar titles, all designed to help business men with their office and printing paper problems. Mention of paper itself is held to a minimum in the back of each book.

Three of the books have proved exceptionally popular, and, accordingly, have enjoyed widespread distribution throughout industry. One is "Recipe for an Orderly Desk," by William Feather. Written by a well-known business author, this easy-readable book is filled with 16 pages of ideas and suggestions that, as experience shows, have helped many executives better organize their work, clear their desk, and save valuable time. to multiply their usefulness in matters of decision.

Another Hammermill promotional publication, "How To Harness A Conference," by Don Herold, also has won plaudits from many quarters. This unique book does a powerful bit of joshing of that august American institution, the business conference. But humorist-illustrator-business man-author, Don Herold, does not leave the subject in the realm of jokes; he shows how one simple printed form will put a meeting on the beam, even before the conferees sit down together, and how a couple of others will turn talk into accomplishment. It's 16 pages of good, interesting, profitable reading, judging by the many thousands of requests for it, that Hammermill have filled since its first issue in 1942.

The third, "Pathway to Executive Success," is a management idea book that gives, in brief, the answers to what earns advancement, tells how individuals progress, and outlines simple plans for planning for success.


"Put That Where I Can Get at It."
YOU should aim at making all your booklets so attractive that they will be kept, not thrown away. A great deal depends on the stock. You are wise when you select one of the
Warren Standard
Book Papers
They work so well you are sure of results. Among them you will find every book paper you need.
Use Cameo Paper if you want to get wonderful results with halftones. On Cameo they have the depth and beauty of photogravures. The plain type page, too, has a richness that is very attractive.
Send for "The Paper Buyer's Guide"
which contains the full line of Warren Standards. Keep it at hand not only for its valuable color and typographical suggestions, but to save you time and uncertainty hunting for the right paper. A copy sent free if requested on your business letterhead.
S. D. WARREN & CO., 161 Devonshire Street, Boston, Mass.
Manufacturers of the best in staple lines of coated and uncoated Book Papers
WARREN STANDARDS ARE CARRIED BY
Constant excellence of product is the highest type of competition

(Courtesy, S. D. Warren Company)

An Early Advertisement of 1913

Paper copy has changed with the years

(Courtesy, The S. D. Warren Company)

Contrast of Numerous Warren Booklets of Twenty Years Ago with the "Help" Advertisement of 1947

It was back in 1922 that Hammermill published "Printing Gets Things Done," and, with that volume, began a service to American business that has continued uninterrupted since then. Thousands of business men still treasure this little volume among the practical books to which they refer, even though the book has been out of print for more than two decades now.

Practical as it was, that early volume was sketchy, and its approach to the use of paper and printing in business management has since been made considerably more explicit in subsequent publications ("Recipe for and Orderly Desk" and "How To Harness A Conference," for example) by Hammermill.

Frequently, so as to advise intelligently on business practices, Hammermill has turned to independent research organizations and specialists, enlisting their talents and services. Result of this extensive work is a series of small books, dealing with individual phases of the broader problem. The three publications cited are included in this group of practical management-idea aids.

Others by Hammermill equally mention-worthy are: "3 Steps That Get Things Done," "Very Promptly Yours," "How To Design A Business Form," and "Hammermill Manual of Paper Information."

Organize, deputize, supervise . . . those, many people will glibly tell you, are the cardinal principles of effective business management. "3 Steps That Get Things Done" tackles the stumbling block to most ambitious workers: How to do these three things. In 24 pages, it deals with specific ways and means, implemented with illustrations of the simple, but effective, machinery of printed and written words on sheets of paper.

"Very Promptly Yours" might well be titled "how to answer today's mail today." In this 16-page booklet, Robert E. Ramsey, author of numerous treatises on the utilization of letters in sales work, outlines practical, office-tested ideas that save unnecessary dictation, route letters promptly, follow up replies, organize correspondence files for quick, easy reference, and generally simplify and speed-up the work of replying to the daily influx of mail.

Properly planned, a business form conveys information quickly and clearly, simplifies work, reduces mistakes, and fixes responsibility. "How To Design A Business Form" is a 16-page book, which reduces a technical form-designing problem to plain terms, so that it becomes easy to create a form that is right when it just comes from the press. Included in the information is a 26-point, 5-minute form-check.

Useful for buyers of paper and printing, the "Hammermill Manual of Paper Information" is a 24-page catalog of Hammermill grades for an extensive range of business printing—bond, ledger, mimeobond, duplicator, index bristol, safety, cover, offset, opaque, postcard and special-use papers. It also includes considerable technical information of value, such as comparative basis weights of different types of paper, dimensions of commercial envelopes, and standard units of mill packaging.

Still another prominent paper products advertising job is that done by the West Virginia Pulp and Paper Company, New York. For the past several years, Westvaco advertising has consisted largely of, and dedicated solely to, establishing desirable publicity and prestige for the company, and not concentrating on certain grades of paper. Reason back of this objective is that the company's production was completely sold.

So outstanding has Westvaco advertising literature proved that, last year, for instance, marked the third consecutive time that the company won awards at the annual advertising shows in New York, which were sponsored by the Art Directors Club, of New York.

"Westvaco Inspirations for Printers" is a publication designed to do just what its title implies, and indications are that it does just exactly that. Of standard 9″ x 12″ size, each issue is beautifully illustrated and printed in color on the type or grade of Westvaco paper recommends for best handling a certain type of job, or presenting a specific idea. Each publication or issue is devoted to a single central theme. No. 157, for instance, directed to "Plenty Comes After Peace" sang songs." Songs of how to use paper, printing, copy, art work, design, plates and color, to make your piping days of peace, days of plenty, also," and told how papermaking, right arm of advertising and pathway for news, chief element of printing, and prime requirement of packaging, was gearing itself for greater and greater production in a world hungry for paper that it wants.

A regular feature of each issue is a reproduction in color, on the cover, of an outstanding painting by noted contemporary American artists, a painting that symbolizes the proposition or editorial theme to which the text of the issue is dedicated. No. 157, for instance, featured "Street Market," by James Chapin, from the painting in the Gallery of Associated American Artists, Inc., New York.

No. 158 of "Westvaco Inspirations for Printers" featured, in picture and by word, the theme of "Season of Growth." A reproduction of "Spring in Central Park," by Adolph Dehn, was the cover illustration. Copy pointed out what Westvaco was doing for increasing the availability of its paper stocks, and advised readers, "during this season of growth," to "keep your weather-eye peeled for new and timely ideas in print." No. 158 proved a pleasant-to-take Spring tonic, that undoubtedly added zest to plans and vigor to the imagination of many printers.

No. 160 was an "Invitation to Explore," new concepts, new worlds, regions of a reality, people next door, realm of research, world of every-day living, new horizons, Pages, covering these and similar ideas, were illustrated by work taken from then-current campaigns, run by various advertisers.

No. 163 was dedicated to "Sweet Land of Liberty," and reproduced on the cover "Sawmill," by Aldro T. Hibbard, a painting in the Grand Central Galleries, New York, Introductory copy was short, sweet, to the point, and packed a punch, as does all Westvaco copy. It's worthy of quoting:

"There's distinctive 'look' to the American landscape that you'll find in no other country. Fertile and rich in resources, the American land offers its people the opportunity of attaining the highest standard of living ever known. Nevertheless, the land is productive only in ratio to the energies and enterprise of its people.

"Production of marketing ideas is also an important part of America's economic life. As every advertiser and merchandiser knows, ideas in print create and sustain markets for goods and services. To demonstrate the power of the printed idea, and the use of fine papers, current and outstanding examples of the graphic arts, in advertising and promotion, are featured in Westvaco Inspiration for Printers."

No. 163 "contains a grand vista of America, in a panorama of forceful ideas, landscaped in paper and printer's ink. Teeming with fresh slants on the uses of printed salesmanship," is a "stimulating cavalcade of design and illustration."

No. 164 (Series of 1947) featured "modern painting and typography," presenting the paintings of seven representative modern artists, The preface continued: "Each significant in itself, they are all of special interest, at this moment, because of the popularity of abstract art, and because of its influence on advertisements, magazines, posters and industrial design. Throughout these pages it has been the designer's objective to find inspiration for each layout in the individual paintings, and to select typefaces and arrangements of typographical elements to harmonize."

Paintings illustrated were: "Harelquin's Carnival," by Joan Miro; "The Woman With the Serpent," Henri Rousseau; "Figure Seated in Wicker Chair," Pablo Picasso; "The Starry Night," Vincent Van Gogh: "Dark Accents." Rudolph Bauer; "Landscape," Raoul Dufy, and the "Egg-beater No. 5," Stuart Davis.

Warren, Hammermill, and Westvaco are not the only stars in the paper world's advertising firmament, of course. There are others too numerous to mention, and which, because of space reasons, cannot be enumerated in detail here, nor their campaigns reviewed. International Paper Company, of New York, St. Regis Paper Company, of New York; Fox River Paper Corporation, of Appleton, Wisconsin; L. L. Brown, of Adams, Massachusetts; Byron Weston, Dalton, Massachusetts, are among the more conspicuous examples.

But, Warren, Hammermill and Westvaco have been specifically cited in detail because their work in each instance has been excellent, and entirely representative of the quality standards that has marked the development and growth of paper products advertising. There is no question that these three organizations, along with others, have set the pace, and that the world of paper products merchandising will continue to see better and better advertising of the industry's products, as time goes on.

In the field of letterhead promotion, the work of Fox River Paper Corporation, Appleton, Wisconsin, is particularly prominent. For years it has enjoyed that

(Courtesy, Byron Weston Company)

Nearly 70 Years Ago

Even in 1878, Byron Weston Co. Linen Record was hailed as the finest record paper

THERE IS A WAY TO GET AHEAD...
Have you ever felt like this?
Send for this FREE book!..
It's FREE!
your conferences get nowhere...
THIS BOOK WILL HELP YOU PLAN THEM RIGHT...
It's FREE!
HAMMERMILL BOND

(Courtesy, Hammermill Paper Company)

A Contrast in Copy

Some of the present advertising of the Hammermill Paper Company, as contrasted with the other specimen of early Saturday Evening Post days.

distinction. It may be said, in fact, to be "letter perfect."

One conspicuous example is a spiral-bound presentation, "Light Up Your Letterhead," edited under the supervision of Artist Dale Nichols, and distributed exclusively to lithographers. In a word, it may be best described by saying that it demonstrates an inspiring and successful design technique, based often on airbrush approach, of "illuminating" a letterhead, rendering a freshness and brightness that create an impressively pleasant atmosphere, and a favorable attitude in the minds of the recipients.

Another excellent promotional piece is "Individual Watermarks for Distinguished Business Stationery," which is designed to assist merchant salesmen of Fox River in soliciting orders for paper carrying prestige-building watermarks of insignias, slogans, etc., to illustrate trademarks, products or names.

Among makers of papers for business records, the name of the Byron Weston Company, Dalton, Massachusetts, is one of the first to come to one's mind. An unusual promotional piece, put out by this organization, is "A Record of Permanent Satisfaction," a reproduction of endorsement letters from 14 concerns which have been B-W customers from 1907 to 1945. In an introductory message, explaining the purpose of the publication, President Hale Holden, Jr., wrote (in 1945):

"Several months ago, while disposing of old correspondence, we came upon a number of letters written in the early 1900s. Most of these letters were written by specialists in the manufacture of record books—men recognized then, as now, as expert judges of fine paper.

"Because there is a fascination about old letters, we had copies made and forwarded to the companies concerned. The response, as shown on the following pages, was most gratifying, and indicative of the lasting satisfaction enjoyed by all who use Byron Weston Company linen record.

"Let me reassure you, as my grandfather, Byron Weston, assured the record keepers of an earlier generation, that Byron Weston Company linen record paper will always prove a stalwart and enduring foundation for your permanent records."

Other stellar promotions, via the printed word, distributed by Byron Weston, include "Hidden Profit," a book outlining to printers the profit-producing possibilities open in their "form" department, and sketching the market for forms among industrial and commercial companies, and "Weston's Record," a publication devoted to the interest of county officials.

A monthly publication beamed to printers, and that long has enjoyed wide interest and high readability, is Crocker-McElwain Company's "Paper News Poster." Of French-fold type, it served a dual purpose, during the war years, by carrying patriotic posters that went up on the walls of shops, factories and offices, all over the United States.

There is little doubt but what the nine 17 by 22 posters will surely win a prominent place in any later history of what advertising did to help win World War II. It is to the everlasting credit of the paper industry that the job was so superbly executed by a papermaker.

An advertising theme of note, originated by Crocker-McElwain, is its famous bond paper pie chart, or paper dollar, of bond paper values. In this series, prominent users of bond papers were queried as to the relative importance of bond paper features to their particular organization. For instance, David Burpee, president of the Burpee Company, Philadelphia, world's largest mail order seed business, rated "appearance and impression of quality" at 70%, workability 10%, opacity 5%. President L. G. Elliott, of LaSalle Extension University, Chicago, rated appearance at 35%, opacity 20%, and folding quality 20%.

Among space advertisers, the St. Regis Paper Company, New York, has done an outstanding job, during the past two years, in acquainting the general public . . . the customers of St. Regis' customers . . . with the name and position of the company as a manufacturer of a variety of wood cellulose products. Through its printing, publication, converting, multiwall bag and kraft paper, Panelyte divisions and others, this organization serves 21 basic industries, which, as St. Regis so ably put it in its 1945 annual report, "enable people to build, to farm, to eat, to read, to travel, to communicate, to manufacture."

St. Regis' splendid institutional series has been running monthly, for about a year, in a number of magazines of general circulation, including Time, Newsweek, Business Week, Journal of Commerce, Chicago Journal of Commerce, Wall Street Journal, Dun's

Review, Fortune, Modern Industry, as well as PAPER TRADE JOURNAL, and other trade magazines.

Products, promoted through this institutional promotion, include the multiwall shipping sacks, which represent, percentage-wise, the largest segment of St. Regis business; printing, publication, and converting papers for national magazines, telephone directories, mail order catalogs, and other specialized uses; and Panelyte, a plastic product for refrigerator doors, and a multitude of other uses.

Another noteworthy space advertising series, sponsored by St. Regis, has been that devoted to "case histories," promoting the sale of multiwall bags and packaging machines, by giving facts and figures on the economies and increased efficiency which diverse leading industries have achieved in their packaging operations, through the introduction of St. Regis systems. These ads appeared in various journals having wide circulation among chemical processing plants.

Typical ads told the story of "How Multiwalls doubled packaging production, and halved packaging costs," "How five manufacturers pack cheaper and better," how "engineered packaging returns substantial savings," etc.

The Mead Corporation, New York, which, last year, marked its first century of service as "Papermakers to America," is a name that also has become synonomous with paper industry progress. Keeping pace with the growing paper market, it now has mills in eight States.

One of these is the historically-steeped Dill & Collins mills in Philadelphia, which, the property of the Mead organization since 1932, trace their ancestry back to America's earliest paper mill, the Rittenhouse, at Germantown, near Philadelphia, in 1690, previously indicated.

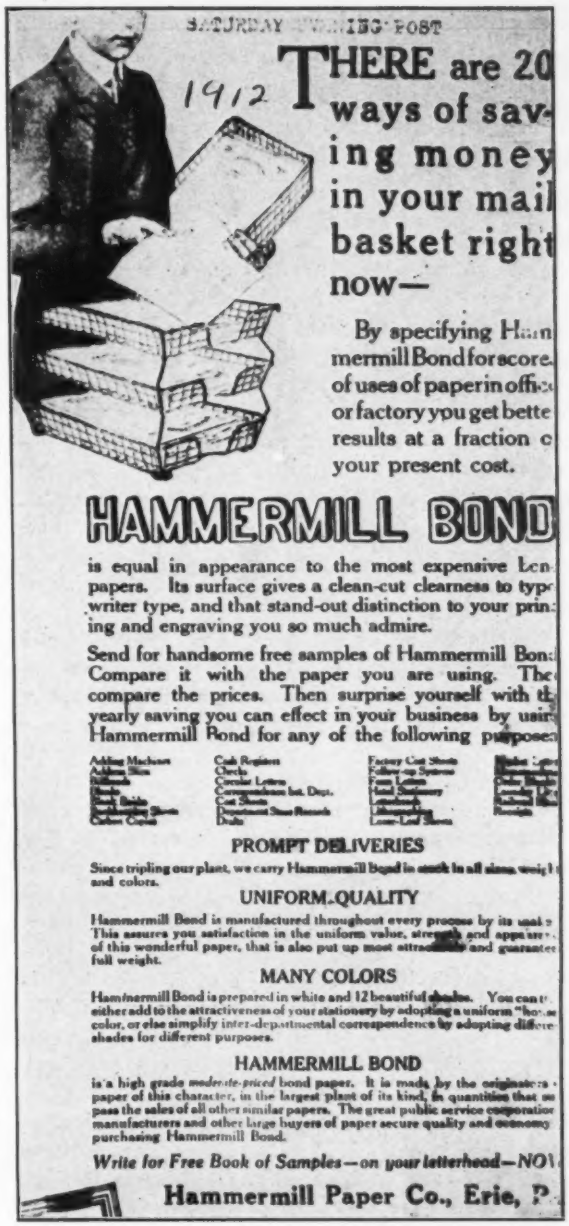
While the original mill was destroyed by flood in 1701, a fate that overtook many an old-time mill, a new mill was built close to the original site, and, subsequently, other mills were built there.

The Rittenhouse watermark was famous in the Colonial days, and many of the first American newspapers, such as the New York Gazette and Philadelphia's American Weekly Mercury, were printed on papers from this mill. In its last years the Rittenhouse mill was used as a cotton factory, and, eventually, came into the hands of Dill & Collins.

Mead makes both "white" and "brown" papers. The company's fine paper divisions turn out practically every type of white paper required for business use, papers which have been extensively advertised for years, and are known to many printers and buyers of printing. These papers include bond, mimeo, envelope and tablet papers, bristols and indexes, coated papers, and a wide range of magazine, book and specialty grades for letterpress, offset lithography, and photogravure use.

Mead's "brown paper" plants produce chestnut corrugating and liner boards, used in the manufacture of boxes and other containers, as well as laminated and specialty boards, used in boxes, packing cases and book covers. Groundwood pulp and papers, hanging papers, and groundwood specialties are still other Mead-made merchandise.

Some of the present-day users of Mead papers are known to almost every American family—the Crowell Publishing Company, Springfield, Ohio, publishers of Collier's magazine, the American magazine and the Woman's Home Companion; McCall's magazine and Newsweek, published at Dayton, Ohio, the Kingsport Press, at Kingsport, Tennessee, book publishers and


SATURDAY
1912
THERE are 20
ways of sav-
ing money
in your mail
basket right
now—
By specifying Ham
mermill Bond for score
of uses of paper in offic
or factory you get bette
results at a fraction o
your present cost.
HAMMERMILL BOND
is equal in appearance to the most expensive Lon
papers. Its surface gives a clean-cut clearness to typ
writer type, and that stand-out distinction to your prin
ing and engraving you so much admire.
Send for handsome free samples of Hammermill Bon
Compare it with the paper you are using. The
compare the prices. Then surprise yourself with th
yearly saving you can effect in your business by usin
Hammermill Bond for any of the following purposes
PROMPT DELIVERIES
UNIFORM QUALITY
MANY COLORS
HAMMERMILL BOND
Write for Free Book of Samples—on your letterhead—NO
Hammermill Paper Co., Erie, P

(Courtesy, Hammermill Paper Company)

Early 1912 Saturday Evening Post Ad
Rather battered, yet still legible copy of a Hammermill ad in the primary days of this ancient periodical.

(Courtesy, The Dennison Manufacturing Company)

Tissue Wrapping Paper Is in Demand

printers of the Alexander Hamilton Institute publications; Time, Life, Fortune and the Architectural Forum magazines; Rotarian magazine, U. S. News, Red Book, Reader's Digest and the Norfolk & Western magazine.

Other white paper products, made by Mead, include book and lithographic papers, used in the printing and publishing fields; bond and writing papers, printing bristol boards, used for general advertising purposes; price lists, calendars and die-cut specialties; index bristols, used for filing systems, office forms and post cards; and uncoated cardboards, used for display advertising. Also of importance is a complete line of standardized coated and uncoated papers, used, primarily, for high-grade commercial printing. Specialty grades include label, envelope and waxing papers, the last named being used, chiefly, in the wrapping of breads and other foods.

Mead-made paper products are widely known throughout industrial society, as they have been extensively advertised, certain ones considerably more than others, for a period ranging over many, many years.

The Mead Sales Company was formed in 1921 to sell, merchandise and advertise the paper, paperboard and pulp produced by Mead and other mills. The Mead Corporation, formed in 1930, and embracing 14 divisions and subsidiaries, is an outgrowth of the Mead Paper Company, formed in 1881, which purchased Ingham Mills & Company, Chillicothe, Ohio, where mills had been erected in 1847, and which is headquarters city for the present corporation. The business originally started in 1846, when Colonel Daniel E. Mead became a paper manufacturer, and, as a partner, helped to found Ellis, Chaflin & Company, Dayton, Ohio. In 1856, this organization changed its name to Weston & Mead, and, five years later, to Mead & Weston. In 1866, Thomas Nixon (a member of an old paper-making family of Philadelphia) acquired the westen interests, and became an equal partner in the new firm of Mead & Nixon. In 1881, Daniel E. Mead acquired full ownership of Mead & Nixon, and changed the name of the organization to The Mead Paper Company. Equipment of the original Dayton, Ohio, plant was moved to Chillicothe in 1907.

This year, another great name in paper products manufacturing and merchandising, Kimberly-Clark Corporation, Neenah, Wisconsin, manufacturers of paper and cellulose products, marks a significant milestone, like the PAPER TRADE JOURNAL, its 75th Anniversary. Advertising-wise, the year is significant to Kimberly-Clark, who are using their 75th birthday as the springboard of an unusually interesting and timely promotional campaign on its new 1947 Trufect and Kimfect levelcoat printing papers, that ties this event and these developments in with today's modern methods and ways of life.

Three broadsides already have been released. Each is printed in four colors. Each is profusly illustrated with drawings or pictures, linking the old to the new. One unit, for example, bearing the caption, "1872—the corner grocery store looked like this when Kimberly-Clark first made fine paper," carries on the cover a drawing of a grocery store of that day. The cracker barrel, the pickle barrel, the two-wheeled coffee grinder, the kerosene can, all surround the heavily-mustached proprietor. Caption on turning the page is, "In 1947 new brightness brings new sales appeal," and shows a close-up in color of the self-service supermarket, as we know it today. Caption copy reads: "The old grocery store, with its dusky atmosphere, laden with scents from a dozen sources, has, today, been changed to a bright and busy buying center—with sales appeal galore. For sales appeal in print, choose the sparkling new beauty of 1947 Trufect. Improved with extra printability, its new brightness gives any plate that taste of quality! Papermaking, too, has come a long way in 75 yeras."

Three engravings show up remarkably well, even though they are not made specifically for this new stock. This capsule description of the company's new product is given: "1947 Trufect printing paper is fully coated, takes 120 to 133-line screen, and has a high ink affinity for wet or dry multicolor and monotone quality printing." In the left-hand corner, on the back page, is given this printing data of interest to buyers: *Press,* 1-color unit; *Speed,* Approximately 1500 impressions per hour; *Ink,* 4-color process—yellow, red, blue and black—plus a special tint; *Makeready,* Underlay and overlay—the underlay is leveling under the plate, and the overlay is building from under the packing on the cylinder; and *Paper*—Trufect levelcoat 60 pound basis.

The other two units in this mail campaign are similarly done. One is captioned "Traveling took on this note when Kimberly-Clark Corporation started making papers 75 years ago!", over a drawing of a stage coach by Francis Chase. Inside, under the caption "and experience has made it much finer," appears one of the Great Northern Railway's new Diesel-powered streamliners. Copy reads:

"Stagecoach makers were once the key men in trans-

portation. Then, about 75 years ago, a golden spike united the first transcontinental rails, and a smoky little locomotive fostered three-quarters of a century of triumphs in transportation. Seventy-five years of papermaking is not without its triumphs, too. For the very paper, on which these words are printed, is alive with newer brightness and truer printability than ever before. It is a vast improvement in the art of papermaking.

"For your printing approval, this is the *new* 1947 Trufect." Papermaking, too, has come a long way in seventy-five years.

Engravings from the Chrysler Corporation, Boeing Aircraft Company, The Glenn L. Martin Company, and the Douglas Aircraft Company, Inc., used by these concerns in their promotional campaigns, are also reproduced on the broadside.

The broadside on "listening pleasure long ago, and listening pleasure today" is similarly outstanding. An old gramophone is illustrated on the cover, and a new RCA-Victor television set on the inside cover. Copy reads:

"As in the reproduction of sound, amazing advancement has been made in monotone and multicolor printing in the brief 75 years since Kimberly-Clark first made fine paper. Likewise, recent scientific paper improvements have produced this new 1947 Kimfect—it's bright, it's fully coated, it prints with new sparkle and brilliance, new trouble-free performance and fidelity. As a companion piece to the 1947 Trufect levelcoat paper, this new Kimfect is expressly designed for volume printing at its finest. Experience makes it so. Papermaking, too, has come a long way in 75 years."

Illustrations, supplementing the copy, are of products made by Kent-Coffey Manufacturing Company, Rich's, Inc., The Magnavox Company, and Stromberg-Carlson Company.

Kimberly-Clark also has gotten out two very attractive sample books, one on Truefect, the other on Kimfect, that also link the company's 75th anniversary with today's modern methods and mode of life. Both are extraordinarily well-done, and should garner considerable attention from printers and buyers of printing.

Wisconsin's first paper mill was built by Kimberly-Clark & Company in 1872, at Neenah, to make paper entirely from rags—a step considered venturesome at that time. It was a great achievement, then, that this mill, with one 72-inch single-cylinder machine, was able to produce two tons a day. In the ensuing years, following the erection of a groundwood mill in 1879 at Appleton, Wisconsin, the development of sulphite fiber was carried forward to the time in 1914, when, again pioneering, Kimberly-Clark started to manufacture refined bleached groundwood.

Today, fine printing papers of a groundwood base, which makes for an excellent printing cushion and high opacity, consume the entire paper mill capacity of the Kimberly-Clark plants at Kimberly, Niagara, Neenah and Appleton, Wisconsin, and at Niagara Falls, New York. A daily capacity of 500 tons of paper, and necessary pulp to make it, is quite a step from the original daily production of two tons, back in 1872, in one small mill.

No mention of Kimberly-Clark's advertising would be complete without mentioning its famous 24-page booklet, "From Trees To Printing Presses." This publication, as its title so aptly implies, traces the various steps required in manufacturing paper from raw material to finished product. It is an educational piece that contains considerable information of value to the layman, and has had wide circulation since its initial issue in 1944.

Dennison Manufacturing Company, Framingham, Massachusetts, is another pace-making paper-maker, which, at one time, hitched its advertising wagon to a historical star. Back in 1944, this company, which produces essential stationery supplies for home, school and office (tags, labels, seals, set-up boxes, marking systems, paper specialties), carried an interesting space campaign in stationery journals, devoted to the theme, "100 years of making paper useful." The occasion for the campaign, of course, was Dennison's own 100th birthday.

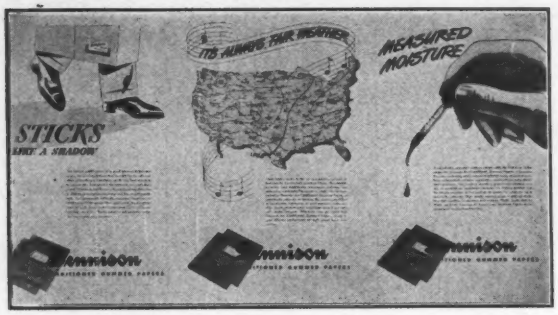
One ad on "Where the First Products of Dennison Were Made in 1844" said: "Just a century ago the Dennison homestead in Brunswick, Maine (pictured) was the scene of the first Dennison manufacturing operation. The job was done by hand, and by a principal of the young firm, Colonel Andrew Dennison. His No. 1 product was a paper set-up box . . . the first ever made in America.

"Tags and labels followed. Constant improvement and diversification, to fit specific needs, expanded the line rapidly. Soon, a real factory was operating full time, and salesmen carried forth the Dennison goods, which set a standard for stationery sundries on counters throughout the country.

"Today, in its 100th year, Dennison pays tribute to the nation's stationers, scores of whom have also reached the century mark, and many thousands of

(Courtesy, Dennison Manufacturing Company)

Merry Christmas Gift Wrapping



(Courtesy, The Dennison Manufacturing Company)

Three of Another Dennison Series

whom now help in the distribution of Dennison merchandise to homes, schools and business offices everywhere."

In another ad of this series, the company explained "Why Shipping Tags by Dennison Have Cut Corners" in this manner: "Back in 1844, when Dennison started business, the tags of the day were generally cloth, folded so that the string had three thicknesses of material to pull against.

"But pull-out strength wasn't the only advantage gained by folding the corners. Unwittingly, tag makers found that tags with folded corners hung freely, did not catch, get dog-eared and torn. Consequently, cut corners are not just style carry-overs from an earlier day. They're as practical now as ever.

"The greatest improvement in tag construction, however, came in 1863, when E. W. Dennison designed and patented the first tag with a round patch. This stepped up pull-out strength tremendously. Further developments were made frequently, and, in the 1920s, the Dennison tag with a barrel patch, increasing its strength even more, was developed and placed on the market."

Still another ad was centered on the theme, "Before That Name Dennison Appeared on a Tag," and went on to point out: "Before E. W. Dennison patented the shipping tag, with the reinforced hole in 1863, most American shippers had their own "direction labels" made from leftover cardboard. Cutting them out was a rainy-day job for shop boys.

"That paper washer, or 'patch,' devised by Dennison to build up the pull-out strength, gave our business men a tag that would stay with its package, from shipment to delivery.

"Today, the same principle is used to assure tags that will stay with the goods. And that same name, Dennison, printed on the patch, guarantees the purchaser of the quality he has come to expect."

A fourth ad related in a nutshell the story of an 1887 accident, Dennison crepe paper. Copy comments: "Walking through a mill producing tissue paper, back in 1887, the superintendent came upon a heap of discarded paper, strangely crinkled.

" 'Sorry, sir,' the operator explained, 'That's from a run that got too much water in it.'

" 'Can you do it again?' the boss very eagerly asked.

They could, and did. And the interesting result, in a variety of colors, became popular overnight for home and commercial decoration.

"Today that same 'crinkled' paper is still in great demand, with the market eager for vastly greater quantities than war restrictions will permit. Today, that same name, Dennison, guarantees every purchaser of a fold of crepe paper all the care, skill and quality which marked the first cartons to be placed on the market."

Another interesting space campaign, sponsored by Dennison in recent years, was that devoted to the "Of Course" idea. In this campaign, various typical users of Dennison products were pictured, each with a quote caption. Examples: "Of course, I use Dennison goods in my class room" (school teacher); "Of course, I use Dennison goods in my store" (haberdasher); "Of course, we use Dennison goods in our office" (file clerk); "Of course, I use Dennison goods in my home" (housewife). Tagline, for the entire campaign, was: "Essential stationery supplies for home, school and office."

More recently, Dennison-sponsored space campaigns have capitalized on the cartoon idea, adroitly exploited and illustrated by O. Soglow. "Tearing Your Hair Out over a new Packaging Problem?" "Put It Up to Dennison and Relax!" Beside the first caption a character is shown tearing out his hair. Beside the second caption he is lolling back in his office chair, contentedly smoking his pipe, with a happy smile of satisfaction gracing his countenance. Another cartoon-type ad, along the humorous vein, asked, "Having nightmares over a tag or label problem?", and answered, "Put it up to Dennison, and relax!" Illustration accompanying the question showed a man slumbering restlessly. In a balloon insert a frightful-looking goon was chasing him. In the second drawing, the same man is shown working at his desk signing papers, smoking a big, black cigar, happily smiling, as his secretary looks on. Basic theme, on which this campaign was based: "Dennison Paper Products That Produce Results."

In 1945, Dennison featured a trade character, "Handy Helper," very effectively in small-space insertions throughout several consumer media. Theme of this novel campaign was a "Jingle Quiz," and comprised 27 jingle quizzes on Dennison products. The campaign, covering insertions in 31 national magazines (general, home, women's, youth and hobby groups), appealed to a readership of 38 million readers.

The company aggressively merchandised this campaign to stationers by publishing a small, but attractive, press book, in which all ads of the campaign were reproduced. Outlining the campaign, Dennison said: "Your own reading interests will probably check with scientific findings on two interesting points: 1. People like to read and think about quizzes; and, 2. People like to read jingles. Readership studies on advertising show that these preferences are well marked. And, so

far this year, the Dennison handy helper combines both features in advertisements in national magazines, magazines which will regularly reach over 38 millions of readers."

Here are three typical handy helper's jingle quizzes, selected at random from the campaign:

"What mends a dollar when it's torn,
Or reinforces papers worn?
What holds the pieces when they're matched,
Without obscuring what is patched?"
(Signature of the ad gave the solution: Dennison transparent mending tape.)

"What comes with alphabets or plain,
And sticks where placed with might and main?
What gives each file a guiding mark
Like lighted street signs after dark?"
(Signature said: Dennison Index Tabs.)

"What comes in ovals, oblongs, squares;
What sticks to glass or earthenwares,
Or even metal in a pinch;
What makes a marking job a cinch?"
(Dennison gummed labels, according to signature.)

A constructive role in promoting greater sales and use of Mill brand papers throughout industry has long been played with remarkable success by the Paper Makers Advertising Association, formerly the Paper Makers Advertising Club, which publishes, on a quarterly basis, the magazine, Direct Advertising.

Founded by Brad Stephens in August, 1911, and acquired six years later by this organization, this publication serves now, as it did then, an important three-fold purpose: (1) to promote the increased use of paper and printing; (2) to grade up the character of printing; (3) promote the use of Mill brand papers. The magazine is published cooperatively, at cost to the members.

Back in 1929, on the occasion of its fifteenth anniversary, the Paper Makers Advertising Club (now the Paper Makers Advertising Association) published an interesting 15-page booklet, authored by William Bond Wheelwright, giving a quick review of the organization's progress since its organization in 1914. Following are certain selected excerpts, which are reprinted here because this organization and its work relate so importantly to advertising of paper products, and, also, because no chronological accounting of the subject would be complete without them, or, at least, a detailed reference to them.

"The charter members of the Club, like the original States of the Union, (which adds another reason for discounting the No. 13 superstition) and included the following: Advertisers Paper Mills, American Writing Paper Company, Beckett Paper Company, Crocker-McElwain Company, Dill & Collins Company,* Hammermill Paper Company, Hampshire Paper Company, Knowlton Brothers, Inc., Southworth Company,* Strathmore Paper Company, Ticonderoga Pulp and Paper Company,* S. D. Warren & Company,* and the Geo. W. Wheelwright Paper Company.

"All but four of the charter members still belong to the Club, including two who temporarily withdrew.

"In addition, the membership now includes Chemical Paper Manufacturing Company, A. M. Collins Manufacturing Company, Louis Dejonge & Company, Eastern Manufacturing Company, Gilbert Paper Company, Hampden Glazed Paper & Cord Company, Holyoke Card & Paper Company, Millers Falls Paper Company, Neenah Paper Company, Parsons Paper Company, and Reading Paper Mills.

"Seven other mills have been temporary members of the Club, and, out of 31 mills which have enjoyed membership at one time or another, the ten following no longer belong, Crane & Company, Dill & Collins Company, District of Columbia Paper Company, Kalamazoo Vegetable Parchment Company, Mountain Mill Paper Company, Southworth Company, Ticonderoga Pulp & Paper Company, Tileston & Hollingsworth Company, S. D. Warren Company, Martin & William H. Nixon, and The Albemarle Paper Manufacturing Company."

The Club's first promotional efforts commenced with issuing "five educational booklets on direct mail advertising, beginning in September, 1914, and extending into 1916. The first booklet entitled, 'We Vote to Work with the Printer,' immediately attraced favorable attention in the trade press, and brought an avalanche of complimentary letters from printers and other believers in direct advertising. Subsequent booklets were no less successful, and the series, written by Brad Stephens, forms an admirably concise treatise on the principles of direct advertising. It deserves to be revised and reprinted in book form."

When this series was completed, Wheelwright continued, "a proposal to take over the magazine Direct Advertising was seriously considered, but action was delayed, and an interim campaign for four double-page spreads in System Magazine for March, June, September and November, 1916, was substituted."

In 1917, the Club acquired Direct Advertising, which has been published quarterly ever since, under the very

(Courtesy, The Dennison Manufacturing Company)

Four Ads of Two Different Series for Dennison

* *Resigned.*

(Courtesy, Kalamazoo Vegetable Parchment Company)

'Vegetable' Is in the Name of the Firm, and Vegetables Its Paper Wraps—Cleanly

competent editorship of its founder, Brad Stephens. Circulation (controlled) has been continuously increased from 6,000 to 8,000 copies. Letters of approval have flowed in to the Club continuously, "and as was justly stated, in an article appearing in Printing in 1918, 'Probably no other one factor has been of as great a direct benefit to the printing trade as has been the constructive work of this Club'."

It may be safely added, Wheelwright also points out, that "no other movement has done so much to establish the dominance of standardized mill brands of paper, to the lasting benefit of consumers, printers, dealers, and mills."

The Club soft-pedaled Mill brand promotion in the very beginning, to be sure, but it was, the booklet states, one of the chief motives of the Club. "Without antagonizing the merchants, but, on the contrary, by winning their hearty cooperation, the Mill brands have gradually been allotted their unquestioned 'place in the sun,' while the entire cause of direct advertising has been measurably advanced by the work of the Paper Makers' Advertising Club."

Another major feature of the Club's cooperative work has been the participation of the organization in joint exhibits at all the direct mail advertising conventions since the Springfield meeting in 1920.

"Direct Advertising, carrying regularly, as it does, samples of paper to a list of 8,000 prospects, is looked forward to by its readers as the fashion news of paperdom," states Wheelwright, adding that "it is the outstanding feature of the nation's paper sampling."

During the past few years, the magazine has been greatly reduced in thickness, due to the critical paper shortage. Editor Brad Stephens says, in this connection: "Our magazine will, by next year, I hope, grow to at least a pound and a half or a pound and three-quarters a copy, as it was before the war."

Most of the nation's mills have very little to offer the ultimate consumer, with the result that their products are usually taken by converters who have little or no contact with the consumer, comments a marketing official of one large papermaker, who points out that a few of the writing paper manufacturers (Crane, Eaton, etc.) have long carried ads for their stationery business. The only two mills in the country, which have ever had a long and sizable campaign to the ultimate consumer, have been Hammermill for bond paper, and Scott, for tissue, this authority reports. Perhaps there have been others. One, for example, is Warren, whose campaigns have been discussd previously.

What actually was the first advertised paper, in the light of the known recorded advertising experience of these concerns, is still a subject of debate in some quarters. Old Hampshire Bond was the first advertised bond paper, if not the first advertised paper, according to Brad Stephens, editor of Direct Advertising.

Still another aggressive advertiser for the "long pull" has been Kalamazoo Vegetable Parchment Company, Kalamazoo, Michigan, manufacturers of genuine vegetable parchment, waxed, bond, wrapping, greaseproof, laminated, household specialties, who have consistently turned in an exemplary performance in promoting their paper products.

Except for its household paper line, which is advertised in a very small way in the leading women's magazines, Kalamazoo has concentrated most on its space advertising, over the years, to certain industries, notably food, covered by some 30-to-40 trade papers. KVP bread wrappers, for instance, are advertised in such papers as Bakers Weekly, Bakers Helper, Southwestern Baker, etc. KVP's numerous papers for the meat packing field are advertised in Meat and National Provisioner magazines. The company hits the dairy industry through Milk Dealer, Milk Plant Monthly, and other similar publications, and carries space regularly in all the paper merchant publications of any consequence.

Kalamazoo considers, however, that its most effective advertising has been achieved through the direct mail medium. Jacob Kindleberger, founder of the mill, always said that the business was built on a 2c stamp, for that is what it cost to send a letter in the early days. Thousands and thousands of personal letters have been sent at regular intervals to prospective customers by the company, all through the years. They have been supplemented by innumerable mailing pieces.

Supplementing these have been a series of calendar mottoes and a monthly house magazine, called the KVP Philosopher. "We would give up every other form of advertising before we would give up these," says Glenn Stewart, KVP advertising manager, "for the offices and libraries of thousands of our customers and prospects are almost literally papered with the mottoes, and the magazine has about double the circulation of the calendar."

The calendar mottoes are made up in a yearly series of 12, one for each month of the year. The motto for

TUSCAN COVER

12 colors; 3 weights; 2 finishes

DUPLEX COVER

11 colors on white; antique and ripple

TWIN-TONE COVER AND TEXT

15 harmonizing colors; 3 weights; novelty finish

ANGELO

8 light, clean colors; text weight; novelty finish

DAWN FLAKE

7 pastel tints; text weight; novelty finish

SPECIALTIES

Wide variety in making orders

YPSILANTI • MICHIGAN

Fine Papers
since 1867

Peninsular Paper Company

YPSILANTI • MICHIGAN

the month appears on one side of the card; the calendar for the month appears on the other. Mottoes are of the inspirational nature. Among those used last year, for example, were these: "Time Works Wonders"; "If any should not work, neither should he eat" (Paul); "Seest thou a man diligent in his business? He shall stand before kings . . . " (Solomon); "Above all . . . to thine own self be true . . . thou canst not then be false to . . . any man." (Shakespeare); "There are 3 sides to every question: *Your* side, *His* side, the *Right* side."

And 1947 calendar mottoes, distributed by KVP so far this year, includes such gems of philosophy and pearls of wisdom as these:

"Fear knocked at the door, Faith answered it. No one was there"; "How far that little candle throws his beams! So shines a good deed in a naughty world" (Shakespeare); "Now I get me up to work, I pray the Lord I may not shirk, If I should die before the night, I pray the Lord my work's all right"; "The people should support the government, and not the government support the people" (Grover Cleveland); "Idle men tempt the devil" (Turkish Proverb); "We don't know one millionth part of one percent about anything" (Thomas A. Edison).

The KVP Philosopher, edited by Glenn Stewart, is dedicated to a "better understanding between man and man." This interesting little magazine is not copyrighted, for, as the company says, "If there is good here, we want to share it," and, consequently, it is sent without charge to all KVP customers, and to business executives who request it on their firm's stationery. That this publication is widely circulated is proved by this little anecdote, which appeared in the May issue:

"Many of you were most generous and gracious in writing about the Uncle Jake memorial edition of this little magazine. It has been widely quoted in the press, and even in the pulpit. We write it for neither audience, just for our friends, who are our customers, but it seems to 'get around.' Just where, and how far, we were hardly aware until, one day last week, when out of the same mail dropped letters from Utah and New Hampshire.

"The one from Utah came from a creamery customer, who is likewise a Mormon bishop, and who felt he had lost a great friend in Uncle Jake. The one from New Hampshire reads as follows:

" 'For the past year I've been a steady reader of your little magazine. A very good friend of mine, a rabbi, passes his copy along to me, and from me it goes to another friend, a schoolteacher.

" 'Could you picture this scene? It is on the beef killing floor of a packing company, operated by 18 men. The rabbi is there for koshering, and the foreman is a Jew, also. Three of the men are French, one is an Italian, one a Scotchman, ten are Polish, and yours truly the only Negro. I call it 'the floor of all nations'.

" 'The rabbi and I often converse on worldly affairs, religion, politics, and, every day, he brings me some part of reading material, which is how I first came by your little book'."

By way of explanation, it may be added that the Uncle Jake memorial edition (February) of the KVP Philosopher was a tribute in print to Jacob Kindleberger, founder of the company, who passed away January 1. Short, punchy mottoes were his meat, an interest that stemmed from listening, during his road selling days, to talks given by Elbert Hubbard. There is something about master salesmen that attracts one to another, and Hubbard was a master.

The Uncle Jake memorial edition reviews the inception of the KVP calendars and the KVP Philosopher. Wrote Glenn Stewart:

"He liked short, punchy mottoes, and was always ducking into some curio shop to collect them. They became sort of a hobby. He would hang them on his office walls.

"One of his happiest associations came from his membership in the Kalamazoo Rotary Club, which he had joined within a few weeks of its founding, in 1914. Its ideals as expressed in the slogans 'Service above self,' 'He profits most who serves best,' greatly appealed to him. He came as near being an ideal Rotarian as that great group of business and professional men can produce.

"This motto idea stuck with him. It was old when Benjamin Franklin used it, older when Elbert Hubbard revived it, but it still had power. In 1934, he put it to work for KVP. He took three favorites, and put them on 9 x 12 cards, with a calendar on the back, and sent them to the mill's direct customers. They continue to this day, and are reproduced each month on the inside back cover of this little magazine.

"One year he took two of them, and had a 'luck'

(Courtesy, Kalamazoo Vegetable Parchment Company)

Even for Paper Dishcloths

(Courtesy, St. Regis Paper Company)

Three of a St. Regis Series Appearing in Business Papers Last Year

pocket piece struck off. One went to everybody on the Philosopher mailing list. Thousands are still being carried. The two sides of the coin read: 'Action with Purpose,' and 'Faith and Enthusiasm Make the Goal.'

"A lot of advertising people turn up their noses at publicity of this nature, calendars and pocket pieces like these, but they work for KVP. That was reason enough to keep them for Uncle Jake. 'Hang on to anything that works.'

"He never compromised with quality. To help ingrain it in the whole organization, he had the words Quality First painted in many places inside the mill. He was a stickler for cleanliness and orderliness, as well. 'KVP makes papers to protect food. We must be as clean as any food factory.'

"Two years before the calendars, this same philosophy was put to work in the form of the KVP Philosopher. For a dozen years he had been writing one, and, often, two letters a month to all the trade. They seldom talked about KVP products. They talked about politics, and religion, and horse races, and boys whose parents gave them high powered cars. They spoke of farming, and store keeping, and paper making, and pie baking. Of cinders, and salesmen, and buyers, and book agents. In short, of everyday events in an eventful life. They became widely known and quoted. An old friend in Rotary, William L. Brownell, often collaborated.

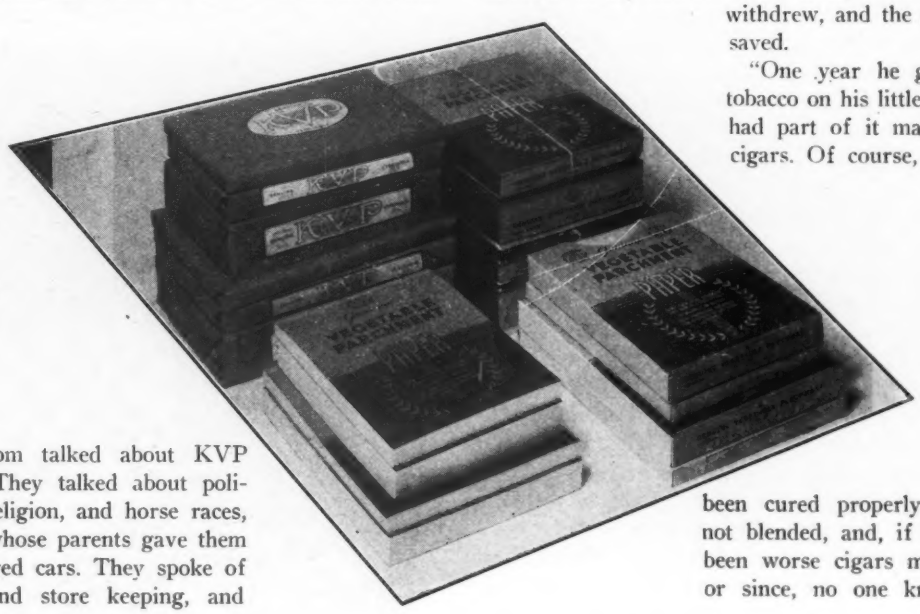
"A letter that people liked was called 'Cinders on the Track.' It told about boys coasting down a long, icy hill. One night they found the slide covered with ashes by an old man who lived at the top. 'We were mad; rip-roaring mad. Every boy in the bunch, with one exception, suggested how we could "get even." But this lad said, "What we fellows want to do is to slide, and throwin' stones at his house ain't goin' to help us none. There's a bunch of shingles over there, let's all grab one and clean off the cinders."

" 'Somebody is always throwing cinders on your track. Somebody is always saying and doing mean things. Somebody is always unfair competition. It has always been so, and it will always be so, but the man who slides along with the least friction and the greatest success is the man who smilingly grabs the shingle of quality and fair dealing and shovels off the cinders.

" 'The success that comes by overcoming obstacles is the only success that really counts.'

"Another letter, that is still remembered by many, had to do with the need for cooperation. In it, he retold the old fable of the herd of asses, attacked by wolves. As long as they faced the wolves, or ran off singly, or milled around in panic, they were easy victims, and, in a short time, half their number was killed. It was then that the wisest of the asses shouted above the turmoil, 'It's time we got our heads together!' When their heads were together, they presented a united front of deadly heels to the wolves, so that the latter withdrew, and the asses were saved.

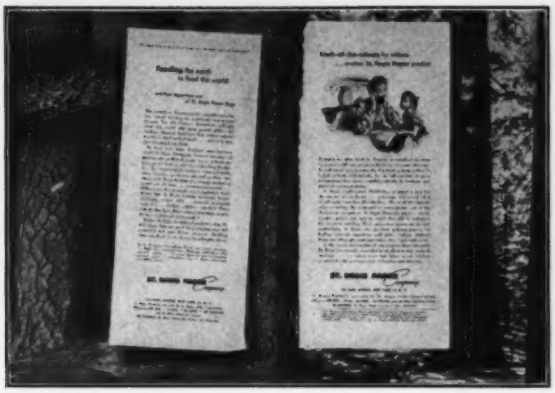
"One year he grew some tobacco on his little farm, and had part of it made up into cigars. Of course, it had not been cured properly, and was not blended, and, if there have been worse cigars made before or since, no one knows about



(Courtesy, Kalamazoo Vegetable Parchment Company)

It Comes in Many Sizes for Many Purposes

American consumers know its value in packaging



(Courtesy, St. Regis Paper Company)

Two Trade Paper Ads of the St. Regis Paper Company in Their Famous "Tree" Series of Current Vogue

them. He gave them to visitors, and had many a laugh as he watched them try to smoke his 'private brand.'

" 'Either give a man the best cigar or the worst cigar, if you want the man to remember you.' No one, who tried those home-grown cigars, ever forgot Uncle Jake.

"Finding incidents like these, sent out in letters, were well received by the trade, he said late in 1931, 'The time will come when William and I will be gone. Let's keep our letters, but gradually work them over into a little house magazine. Maybe it will work.' The first issue came out in January, 1932. It was called the KVP Philosopher. Like the letters, it did not say much about KVP papers. It left that to the salesmen. It bore on its masthead its reason for being . . . 'the hope that it may aid in a better understanding between man and man.' A little later was added: 'Not copyrighted. If there is good here, we want to share it.' Uncle Jake loved to share good things."

Hundreds of paper mills do so little advertising, other than sending samples periodically to jobbers, that they can hardly be said to advertise at all. "I doubt if there are 25 mills in the country which have a record of consistent advertising in the ordinary sense of the word," one authority reports.

This state of affairs has, at one time or another, caused considerable concern in certain quarters of the paper industry because it looked as if the industry, which benefits so much by the use of its products in the advertising of others, was backward in setting forth its own wares. Closer study, however, gives some excuse, because most of the mills sell their entire output to a very limited number of outlets . . . possibly only 5 or 6 distributors, and to 25 or 50, at the most. Most of these, in fact, resell it under their own trade name, and the identity of the manufacturer is lost forever.

As far as food protection papers go, KVP is the nation's largest advertiser. It's a fairly safe gamble that, as you read this, there are several KVP sheets in your very own home, as this company makes papers to wrap butter, oleo, meat, fish, vegetables, bread, fruit, cheese, poultry, crackers and many other edibles. Yet it is unimportant that your wife know about this, because, as Glenn Stewart puts it, "even the wives of KVP people will not demand these products wrapped in a KVP paper." The products of other mills likewise lack mill identity, and rightly so.

Very few mills have products that lend themselves to radio or newspaper advertising, or to billboards. A few of the household waxed papers, and several toilet and towel papers, are OK for magazine advertising.

But general consumer advertising is scarce in paper mill copy for another reason. And that is the still vacant national scale of paper sales that should be based on brand, rather than mill, product. Until the mills consider the merchandising of paper by brand more profitable than by mere tonnage of classification and grade, the market will accept what it gets, and no more. There is a wide vacancy in the mill field for emphasis on what the eventual consumer shall receive. It is being accomplished in other fields—why not in paper? In the future there is this prospect, this necessity. It is necessary because it standardizes paper as it standardizes every consumer product, even though it passes through several distribution and processing hands before reaching that consumer.

Aside from the three advertising trends already enumerated and discussed—the trends to advertise productwise, servicewise, and institutionally to promote prestige and garner goodwill—another significant trend has been definitely on the increase. That development, a recent one from the comparative time standpoint, is wrapped up in the enlarged consumer advertising programs, sponsored by a number of fine paper mills, such as Fox River, Strathmore, Warren, Hammermill, American Writing, Gilbert, Neenah, Rising, and others.

Behind this development stand essential reasons, most important of which comprise these three:

1.—The desire for name acceptance, outside the field of graphic arts.

2.—This, in turn, is posted on these trends: (A)

(Courtesy, St. Regis Paper Company)

Two More of the Famed "Tree" Advertisements of the St. Regis Paper Company

(Courtesy, St. Regis Paper Company)

Through the Forest of "Tongues in Trees," as Shakespeare Observed, Can Be Seen These Two Ads of St. Regis

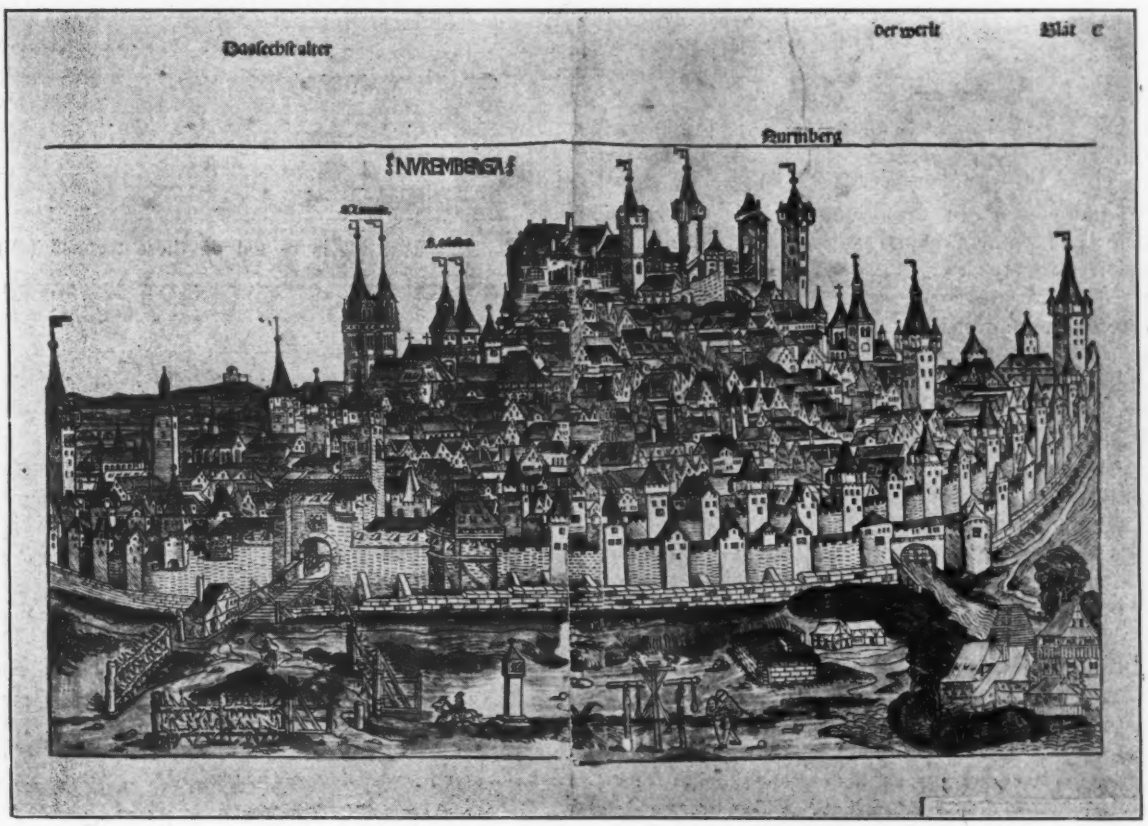
more "laymen" (non-printers, that is) are now specifying paper than ever has been the case heretofore. This means, as one authority has commented, "to limit your advertising to paper trade papers is to endanger your chances in this 'new field';" (B) increase in the number of the so-called "captive" printing plants—establishments operated by business and industrial firms, to serve their own expanding specialized needs. Here, the purchasing agent, or some other executive, generally buys the papers used for the company's printing, and, therefore, he is a "consumer," in that he is not a printer.

3.—Rise in the stature of the purchasing agent, whose importance in most business and industrial offices has steadily increased, until he is now one of the most important of company executives. The more successful of P. A.'s make a real effort to know the variations in grade and quality of the products they buy—and this includes paper.

There are, of course, numerous other trends affecting rag content paper manufacturers. Chief among these are: the growing interest in letterheads, as advertising and public relations purveyors or messengers; the widening use of direct mail, as a "sales tool;" and general, all-around improvement in all printed pieces—annual reports, insurance policies, programs, announcements, invoices, statements, letterheads, and hosts of others.

No Advertising Necessary for this Mill

Wood-cut of Nürnberg from Schnedel's Liber Chronicarum, published in 1493. The group of five buildings, outside the wall, in the lower right corner of the picture, was Ulman Stromer's mill, the first mill in Germany, 1390. Here occurred the first recorded labor strike in the paper industry in 1391.



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

CHAPTER XXIII

Biggest Buyer of Paper Is Government Printing Office

NO history of paper would be complete without a story on the largest of the buyers of printing papers. And, unquestionably, that buyer is the United States Government Printing Office, at Washington, District of Columbia.

Annually, more than 3,000 carload lots of paper make their way into this huge establishment, and are consumed by the Office in the course of its manufacture of the printing and binding requirements of Congress and the United States Government.

In addition to the carload lots, which total approximately 175,000,000 pounds a year, there is also a total of over 2,000,000 pounds of paper delivered annually to its warehouse by truck. In the language of paper men—that is some paper.

This, however, doesn't even begin to tell of the paper that was purchased and used by the Government Printing Office during the war, just passed, when much of its printing was procured commercially, due to the tremendous volume of work. In those hectic days it was not uncommon to find the Government Printing Office using paper at the rate of 1½ million pounds a day, or a total of one-half billion pounds of paper a year.

Comparing these figures with those of an early historian, we find that, in 1892, a stockpile of 300,000 sheets of varying sizes was considered an incredible quantity for this Office.

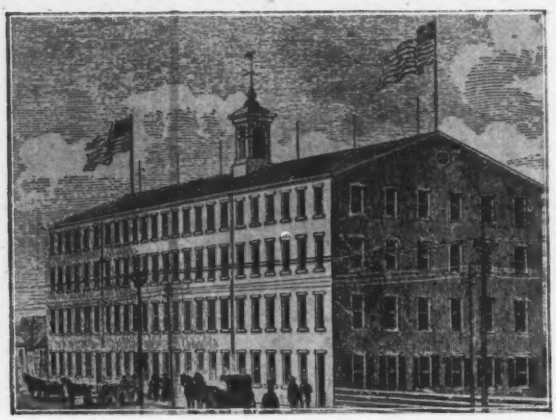
Printed matter, whether bound or not, is the number one product of the Government Printing Office. Because of this, paper is of prime importance, and has been ever since the Office began to function as an independent establishment, back in 1861.

Its consumption of paper, even at that time, while not nearly so great as that of today, was, by far, greater than that of existing commercial plants.

Printed requirements of Congress and the United States Government have always been great. You can't run a nation and keep it informed without the printed word and necessary forms to make it function.

These Are the Main Buildings of the Government Printing Office at Capitol and H Streets, N.W., Washington, District of Columbia

(Courtesy, Government Printing Office, Washington, District of Columbia)



(Courtesy, Gov't Printing Office)

Line Engraving of the Original Printing Office of the Government in Civil War Days, 1861

Yet, in 1794, when the requirements of Congress were not so great, history tells us that Congressional appropriations, for printing and binding, were so small that they were then lumped under another appropriation, titled, "firewood and stationery."

In that day, Congress appropriated for its own work but $2,000. For the Treasury Department it appropriated $4,000; for the War Department, $800.

But, as the nation grew, so did the printing demands of Congress and the Departments. So much so, that, in 1860, Congress authorized, by an act, the erection, or purchase, of a printing office, for the purpose of producing printing and binding for "the Senate and House Representatives, the Executive and Judicial Departments, and the Court of Claims."

This act, however, was not fully accomplished until March 4, 1861, when the Government Printing Office began to function as a government agency in a newly purchased 4-story structure, located on the site of its present large establishment. Purchase, including plant and machinery, cost the Government $135,000. With it came a total of 350 employees to run it.

Today, the plant is as modern as any in the world. Number of its employees has grown from the original 350 to a present working force of over 7,000, at an annual payroll of over $12,000,000. Its present value, including buildings and equipment, is far in excess of $16,000,000. Annual value of its product, based on cost, greatly exceeds $20,000,000. Compare this with that of the original plant, which, in 1861, amounted to $700,000.

Power on the throne at the Government Printing Office is Augustus E. Giegengack, of New York City. He carries the title of Public Printer. At the time of his appointment, Mr. Giegengack was the youngest man ever chosen to fill the office. His appointment was made at the hand of President Franklin D. Roosevelt July 2, 1934.

In his 13 years as Public Printer, Mr. Giegengack has created many changes. Upon taking office he installed a cost accounting system that now tells, in advance, the cost of each job. It was he who obtained its new, immense warehousing facilities; the new 8-story building, matching that erected in 1903, and the addition of many new presses. Mr. Giegengack has also been instrumental in cutting the costs on much of the Government work, and that of Congress. Of importance in this line, were the changes he made in the printing of the Congressional Record, prior to the war.

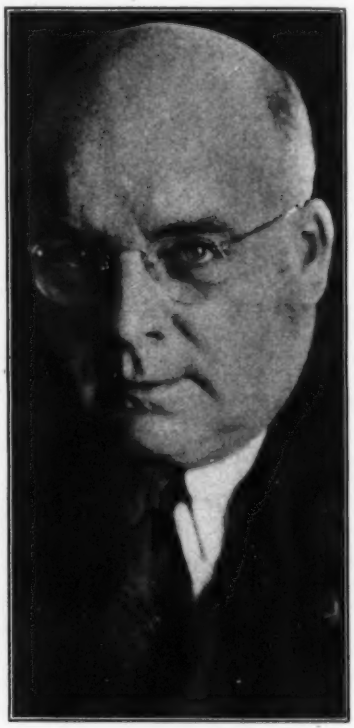
Being a printer, Mr. Giegengack is one of the few men, to hld the Office of Public Printer, who really understands the work. In fact, it might be said he grew up in the composing room, for his mother and grandfather, before him, were printers, too. Prior to entering the Government service Mr. Giegengack held an executive position with the DeVinne Press, of New York City.

Before that, he served his country as a soldier in the infantry of World War I. While in the service he was chosen to supervise the mechanical production of the "Stars and Stripes," official organ of the American expeditionary forces.

But few people have an idea of what a big-time job it is to run an establishment as large as the GPO. As a result, but few people understand the job of Public Printer. Altho criticized on many occasions, and belabored on many another, Augustus E. Giegengack, as Public Printer, has performed one of the finest jobs of any in the Government Service. He has achieved results, and at as reasonably a low cost as possible. No one can deny this. His record will back him up.

It was he who worked out the straight-line production system for the Office, and achieved the steady flow of the work it produces. This was important during the war from which we have just emerged.

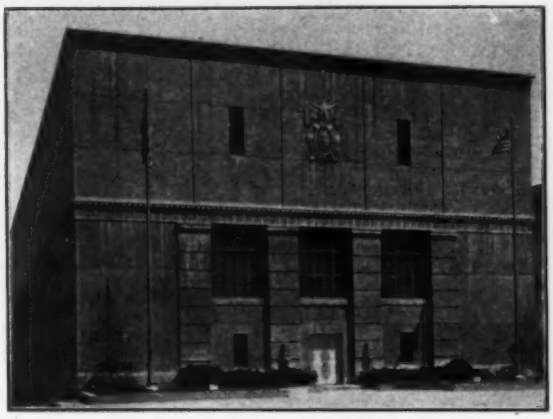
Because of the methods of space assignments he has worked out, the production of all work begins at the top of the building, with planning, composition, platemaking, and presswork progressing



(Courtesy, Gov't Printing Office)

Honorable A. E. Giegengack

Public Printer of the United States at the Government Printing Office, Washington, District of Columbia



(Courtesy, Gov't Printing Office)

Three Story Paper Warehouse of the Government Printing Office

downward thru the tremendous biuldings to the ultimate shipping.

Paper, when it first enters the building, moves up to the pressroom, and, from there, it moves horizontally across convenient bridges to the bindery sections, so located as to correspond with the press sections, from which each receives most of its work.

Once the bindery operations are complete, the work goes on down, if it is to be delivered to a recipient immediately, or upward, if it goes to the Superintendent of Documents for mailing or storage.

A brief description of the plant may be given, to convey a picture of the location of the various printing operations.

In the basement of the newest of its buildings, Annex No. 3, is the power-plant. Here too is stored paper and plates.

First floor has the main entrance lobby, guards office, paper storage, sheet cutting, paper issuing, power-plant, and battery charging.

On the second floor is the Office of Superintendent of Stores, and that of traffic manager (new since the war), offset and tabulating machines, card section, offset camera, and platemaking, roller making, and paper storage.

Job composing and job press sections line up on the third floor, as do the job composing proof room and plate vault office, while the whole of the fourth floor houses the main pressroom and its superintendent's office.

Located on the fifth floor is the platemaking section, its superintendent's office, the finishing section, wood blocking section, and the record press, title page, and press sections. There is also located on this floor a fully equipped emergency hospital for the employees of the Office.

On the sixth floor are located such miscellaneous sections as electro molding, electro plating, sterotyping, plate lockup, hand and linotype sections, metal melting, and metal storage.

Housed on the seventh floor are the photo engraving, casting, and correcting sections, monotype keyboard, main proofroom, and the office of superintendent of composition.

Eighth and top floor contains the executive offices of the Public Printer. These include the offices of his administrative assistants, the director of personnel, the director of purchases, production manager, planning, estimating, accounts, statistical records, tabulating machines, specifications, commercial planning, field division head, and the telephone switchboard.

In the old 1903 building, on the eighth floor, is located a large cafeteria, seating 800 people at one time; a large auditorium; reading and game rooms; and 6 bowling alleys. Also computing and repay sections.

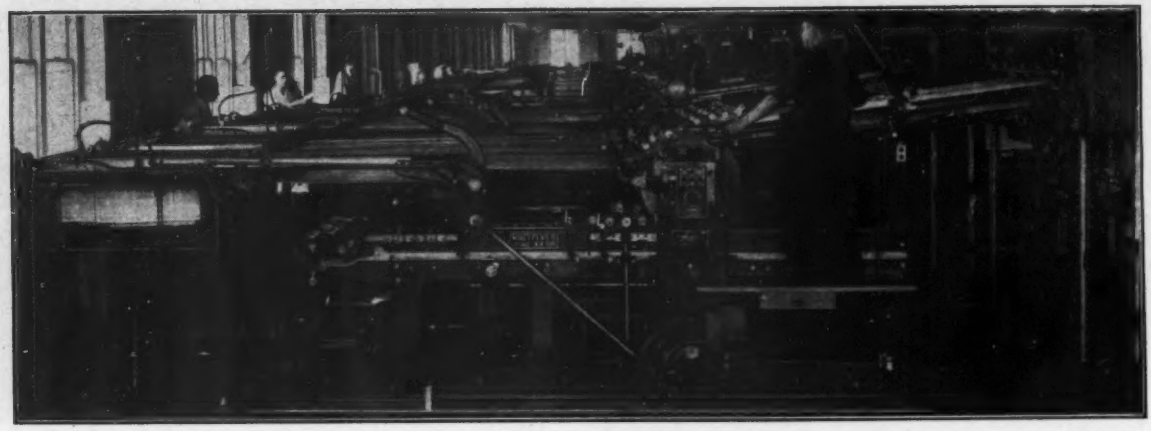
Going down thru the floors of this building will be found the facilities for the binding of pamphlets and books, storage of publications, a library, a reference section, the division of test and technical controls, and the superintendent of documents. Basement and sub-basement are taken up, mainly, in the storage of paper and other materials. In the sub-basement, also, are the facilities for bailing waste paper, which is accumulated at the rate of 2,000,000 pounds a month. Sold annually to the highest bidder, this waste amounts to a considerable saving to the Office.

Across North Capital Street, and facing the old No. 1 building, is located the new governmment Printing Office warehouse. It is a 3-story and basement structure, designed to carry a load of 500 pounds per square foot. Approximately 700 carloads of paper, weighing 40,000 pounds each, can be stored in the warehouse at one time.

Rear of this building abuts First Street, N.E., op-

(Courtesy, Gov't Printing Office)

Beautiful and Symbolic Main Entrance of Newest of the Government Printing Office Buildings



(Courtesy, Government Printing Office, Washington, District of Columbia)

Batteries of Letterpress Printing in Action in Main Pressroom of Government Printing Office, Where So Much Paper Is Consumed, Daily and Annually

posite Union Station, and a double-track spur runs from the main track there directly into the warehouse at the third floor level. On these tracks, inside the building, 16 freight cars may be accommodated at one time for loading and unloading.

Also housed in this biulding are the postal card and money order sections of the presswork division. Both sections turn out millions of these items a day on their presses.

To transfer the rolls of paper from the freight-car siding there is an automatic lowerator. When a roll is placed on a receiving platform, on the third-floor level, it automatically rolls onto the lowerator, the door of which closes, and the roll descends to the second floor, where it leaves the lowerator, the latter then returning to the third floor for its next load. The entire operation is automatic.

Most of the warehouse building is taken up by the stores division. which handles more than 200 carloads, or 8,000,000 pounds, of material and supplies each month. Most of the paper is received on skids and in rolls. These are unloaded from freight cars by means of electric power trucks, which enter the car, pick up the skids or rolls, and carry them to the unloading platform. Telescopic electric fork trucks, platform trucks, and tiering machines are used in piling the paper for storage. All paper is hauled for use by means of trailers, drawn by electric tractors, traversing a tunnel under North Capital Street to the main buildings on the other side.

Like any other business, the Government Printing Office is operated by its head, the Public Printer. He controls the affairs of the Office thru three general operating divisions, namely: administrative, planning, and production. The administrative divisions are engaged in the functions of personnel, purchasing, accounting, and related operations. The production divisions are engaged in the actual mechanical production within the Office. Planning divisions are engaged in general departmental relations and the development of all programs reaching the Office, and in directing their production.

For those who do not know, it might be said, the Government Printing Office is not a profit-making establishment, and, hence, it does not include in its cost any return on invested capital, nor any interest on borrowed capital. It pays no taxes, has no selling expenses, and carries no insurance. It has a regularity of work, and, behind its operations, it has the purchasing power of the United States Government. Thus it is that the Government Printing Office has always been able to reflect a far greater value and larger production than any of our larger commercial plants.

Historically, the Government Printing Office has always played an increasingly important part in the affairs and progress of the nation. By its printing alone, it has made possible the capable and efficient operation of the Government by constantly furnishing the necessary forms and documents to conduct the nation's busness.

Thru peace time years it has turned out millions of books, pamphlets, and folders, for public distribution, that all citizens might benefit from the valuable information made available by the study, research, and laboratory discoveries of the specialists engaged in the various departments.

World War II, however, quickly put an end to many of the items which were not considered essential, and, in their stead, the Office took up the production of the printed demands of the Armed Services. Naturally, then, the most rapid expansion the Government Printing Office has ever experienced came during the war years. This is clearly shown by the tremendous increase of printing the Office was called upon to do thru the years 1939 to 1945. In 1939, the Government's printing and binding requirements amounted to but 20 million dollars. By 1945, the figures had increased to 80 million dollars, two-thirds of which had to be procured commercially.

A typical example of the wartime work is the Sol-

dier's Handbook, that foundation stone of every rookie's training, which, during one 12-month period, totaled some seven million copies of 264 pages each. In other words, just one of the many big jobs the War Department placed in the Office.

To be more explicit, the War Department, alone, averaged over 600 requisitions a month for books and pamphlets, army regulations, training and field manuals, which, in themselves, totaled over 40,000,000 copies per month.

For that matter, it was not at all uncommon to find some 10,000 to 15,000 jobs in the Office during those days, which were in some stage of production, or which were in some stage of planning for commercial production.

Ration-coupon accounting, thru the banks alone, required 300 million envelopes, which, in other words, meant 4,400,000 pounds of paper.

In the year 1943, a total of over 4 billion forms and books were produced, using approximately 75,000,000 pounds of paper. This, does not, however, begin to tell the story of the work behind the scenes.

For example, to secure such large quantities of paper it was necessary that the paper mills of the country grind out their product night and day. Trucks, railroads, and men became important to its delivery. Printers and printeries, performing the work, set into motion thousands of machines, presses, and folders. Each had some particular operation to perform.

Problems, by the hundreds, arose like barriers to hamper and delay the many programs. Trucks broke down, drivers were killed, paper was damaged, burned, or destroyed. Fires ravaged warehouses, creating further shortages—not to mention the shipments that went astray. Telephones rang, wires hummed, and delays proved costly.

America's war effort, however, was not all confined to the battlefield. Such phases of its internal economy as the rationing program had a definite part in the whole of the setup. In fact, the printing of the ration stamps alone proved to be the biggest printing job in the history of the world. On a special forgery-proof paper some 73 billion ration stamps were printed. Manufacture and processing of this paper kept six mills busy thruout its production.

Everyone, of course, remembers the Treasury Department's war loan drives. Paper that was used in their printing and advertising was tremendous. Yet, the importance of the work of the Treasury Department, at that time, needs no explanation.

Attention, however, is called to the tax program, which, as a result of the war, has grown terrifically. For instance, Treasury's annual income tax program called for some 32 forms, from which were printed a total of over 800 million copies. To print these it took 8 million pounds of paper, approximately 200 freight cars, which ultimately reached every community in America, and went into practically every home in the nation.

Shipping of paper and printed forms, on such programs as this, and those of the OPA and others thruout the war, alone made the Government Printing Office the largest individual buyer of paper in the nation—and in the world—for that matter.

War's end, however, has not cut down the production of this plant, to any great extent. Such programs as the Treasury's income tax planning must still be reckoned with, and its paper requirements are just as large. Nevertheless, the most recent of the paper consuming jobs the Office has are those of the War Assets Administration and the Veteran's Administration. Both have required printing of all kinds and in terrific volume.

One of the largest of the jobs the Office has had to contend with since VJ day is that of the Pearl Harbor report for Congress, which eventually grew to some 20,000 pages. Though but 8,000 copies of each volume were printed, the paper stock, used in its printing, ran well into the millions of pounds.

Undoubtedly, the most impressive and famous pub-

Laboratory Section in the Division of Tests and Technical Controls, Government Printing Office, Where Paper is Either Passed or Rejected

(Courtesy, Government Printing Office, Washington, District of Columbia)

(Courtesy, Government Printing Office, Washington, District of Columbia)

Paper Storage, Basement of the Old 1903 Building of the Government Printing Office

lication of the Government Printing Office is that of the Congressional Record, which, according to the latest figures, has run over 20 volumes and 20,000 pages.

Printed daily, the Congressional Record has, in itself, proved to be a herculean task for the Office. This has been due to the fact that the Record, no matter how many pages, must be printed and bound and in the mails by 8 a. m., the following morning after copy is delivered to the Office.

This is a real feat to accomplish when an extra long or busy session of Congress causes copy to come into the Office at an hour well after midnight. Yet, never once has the Office failed in its mission of setting up, printing, and delivering the 40,000 or more copies desired each day. The largest Record to date contained 366 pages.

Aside and apart from its printing and binding, the Office maintains one of the largest of the book stores in the nation. This is the documents division, Official in charge is the Superintendent of Documents.

This division, often called "Uncle Sam's Bookstore," prepares and issues catalogs and price lists of all Government publications, and maintains a complete collection of books, pamphlets, and maps, grouped according to the department publishing them.

Some idea of its immensity may be gleaned from the fact that, at all times, there are in stock some 30,000,000 copies of more than 70,000 titles. Last year alone, 37,000,000 copies of Government documents were sold. and nearly 122,000,000 more were distributed to libraries, schools, individuals, organizations, and others on the mailing lists of the various Federal departments and agencies.

Most important division to paper manufacturers and dealers is the purchasing division. It is this division that makes all purchases for the Government Printing Office. It is this division, too, that arranges all sales of waste paper and materials.

Annually, the purchasing division places orders that run well over $7,000,000, the bulk of which is spent for paper in numerous various sizes, grades, and kinds.

Its purchases, however, are made by sealed bid, once each quarter of the year, when dealers, manufacturers, and paper houses are called upon to place a bid for a three months period. To participate in these bids it is necessary that each apply for the necessary blank proposals, which contain instructions, schedules, and specifications, as well as standard samples. Such proposals are obtained by addressing A. E. Giegengack, Public Printer, Washington 25, District of Columbia.

Sealed proposals, on any of the advertisements put out by the Office, are received up to 10 a. m., the day of the sorting of the bids. Then the proposals are opened publicly, and read in the presence of the joint committee on printing at the Capitol building. Bidders or their representatives may be present.

In the interests of the Government, all contract awards are made to the lowest and best bidders, whose bids conform with the requirements of the proposal.

Because of the inability of the Office to get complete coverage for its quarterly paper proposals, and in order to meet special non-recurring needs, it has become necessary for the Office to make additional purchases in the open market, from time to time. These market purchases are 50% of all the orders placed.

Just to give an idea of the great amount of paper the Office needs, let us cite as an example one of the recently advertised quarterly proposals. Approximate estimated quantities set forth in detail in this particular schedule is as follows: 2,400,000 pounds newsprint paper; 1,150,000 pounds machine-finish book paper; 50,000 pounds English-finish book paper; 800,000 pounds offset book paper; 250,000 pounds offset poster paper; 50,000 pounds antique book paper; 80,000 pounds 50% laid antique book paper; 1,250,000 pounds supercalendered book paper; 500,000 pounds coated book paper; 900,000 pounds mimeograph paper; 40,000 pounds duplicator copy paper; 300,000 pounds U. S. M. O. safety writing paper; 16,850,000 pounds writing paper; 490,000 pounds map paper; 210,000

pounds manifold paper; 2,005,000 pounds bond paper; 655,000 pounds ledger paper; 740,000 pounds index paper; 135,000 pounds cover paper; 150,000 pounds manila paper; 380,000 pounds kraft paper; 100 sheets white gummed paper; 40,000 pounds tag board; 65,000 sheets railroad board; 400,000 pounds wood cardboard; 50,000 pounds chemical wood tan board; 6,150,000 pounds postal card paper; 50,000 sheets pressboard; 400,000 pounds newsboard; 120,000 pounds binder's board; 40,000 pounds chestnut cover board.

Representative samples, of all paper delivered under contract, are tested physically, microscopically, and chemically by the division of tests and technical controls within the Office. This is done to determine whether the specifications have been complied with, and if the color, finish, formation, cleanliness, and writing and printing qualities are up to standard.

Division of tests and technical controls is prepared to assist in the preparation of standard specifications, and the Office, itself, is open to the bidders and contractors, at any time, who wish to acquaint themselves with the instruments and methods used in testing the paper.

For this work the division of tests and technical controls maintains a most complete laboratory. It is devoted to printing and bookbinding problems, and research in the field of the graphic arts, and has, at all times, proved itself a valuable adjunct to all Government departments and the printing industry, as well. PAPER TRADE JOURNAL, itself, has published many articles, that have come from this division, in its research work on paper.

This division, which might be called the "watchdog" of the Office," has, on many occasions, rejected many a paper shipment because it failed to measure up to the standard of the Office. Proof of this fact is given in the Public Printer's annual report for 1940, which states that the division of tests and technical controls, in that year, rejected a total of 191 deliveries of paper because of a non-compliance of specifications. In spite of the fact this seems like a rather large figure, it represents but 1.15 percent of the total paper received and speaks well for the paper manufacturers.

Today, in buying its paper, the Government Printing Office is using a 1,000-sheet unit for all orders. In other words, this is the basis for sheet-size, substance, weight, and cost. The unit classification, however, does not apply to roll stock, which is measured in pounds.

Most of the jobs completed in the Office, and most of the blank paper sold the Departments, is computed in sheets. To simplify the operation, so that the Depart-

Freight Cars on Tracks Entering Government Printing Office Warehouse, Where a Day's Supply of Paper, 16 Cars, Can Be Handled Simultaneously

(Courtesy, Government Printing Office, Washington, District of Columbia)

ment heads and its computing staff may readily understand and base their costs and charges, the Office has prepared a standard stock catalog and price list for their use.

In this, each of the papers is assigned a property number, and is listed according to kind, weight, and cost. Listed, also, in the catalog are the sheet sizes of the various kinds of paper available.

When buying paper, the Office, by closely watching the paper market and the trends therein, and by placing orders for standard stocks at the most opportune time, has managed to affect substantial savings on many occasions. In fact, as much as $45,000 a year has been saved by such wise buying.

Back in the old days the Office purchased most of its paper in ream lots. That is, by the 500 sheets. Among the early paper contractors, sharing in the sales of paper to the Government Printing Office, were: Wm. M. Singerly, Moorehouse Brothers, F. W. McDowell, Megargee Brothers, and Alexander Balfour, all at Philadelphia; Seymour Paper Company, New York City; A. L. Hollingsworth, Boston; Bulkley, Raiguel & Co., Philadelphia; Easton & Rupp, Washington, District of Columbia; S. Trier & Son, New York, and Woolworth & Graham, New York.

Joining these, in the year 1866, the year in which the Office reported a 12 per cent increase in the amount of paper being used, were the following: Essex Paper Company, Philadelphia; Winona Paper Company, Holyoke, Massachusetts; and the Wolf Brothers, at Philadelphia.

Today's paper suppliers are many. To mention a few, is listed the following: R. P. Andrews Paper Company, Washington, District of Columbia; The Barton, Duer & Koch Paper Company, Washington, District of Columbia; Bermingham & Prosser Company, Chicago, Illinois; Bulkley, Dunton & Company, New York; Cauthorne Paper Company, Inc., Richmond, Virginia; The Central Ohio Paper Company, Columbus, Ohio; Consolidated Paper Company, Monroe, Michigan; Consolidated Water Power & Paper Company, Wisconsin Rapids, Wisconsin; District of Columbia Paper Mills, Inc., Washington, District of Columbia; Eastern Corporation, Bangor, Maine; Franklin Research Company, Philadelphia, Pennsylvania; Graham Paper Company, St. Louis, Missouri; Howard Paper Mills, Inc., Dayton, Ohio; Kalamazoo Vegetable Parchment Company, Kalamazoo, Michigan; The Mead Sales Company, New York; The Mudge Paper Company, Baltimore, Maryland; The Old Dominion Paper Company, Norfolk, Virginia; Paper Corporation of United States, New York; Frank Parsons Paper Company, Washington, District of Columbia; D. L. Ward Company, Philadelphia, Pennsylvania; The Whitaker Paper Company, Baltimore, Maryland, and Wilcox-Walter-Furlong Paper Company, Philadelphia, Pennsylvania.

In the PAPER TRADE JOURNAL, from time to time, the requirements of the Government Printing Office are published in requisition classifications. These details cover the exact specifications of the Office. All qualified firms are therefore permitted to bid upon these requirements, and the foregoing mills and converters are merely a few of the total, as mentioned. To buy such quantities of standard paper, and to get the precise qualities and stocks desired, is quite an undertaking, even for the Government Printing Office.

In these days of short stocks, long prices, the Government has repeatedly done remarkably well to acquire just the paper it desired. To save $45,000 on one year's total paper purchases is a feat that any mercantile house would be proud of. It is, indeed, remarkable under Government auspices.

An Office requiring nearly 2½ million pounds of newsprint is a great institution in itself. And over a million pounds of machine-finish book paper is also a large order. Added to that is the English-finish book, the offset book to a total of nearly another million pounds, inclusive of antique book, and another million and one-quarter pounds of supercalendered book, with another half million of coated book, as previously mentioned. These listings are emphasized, because it is only a great printing house that buys in such liberal quantities.

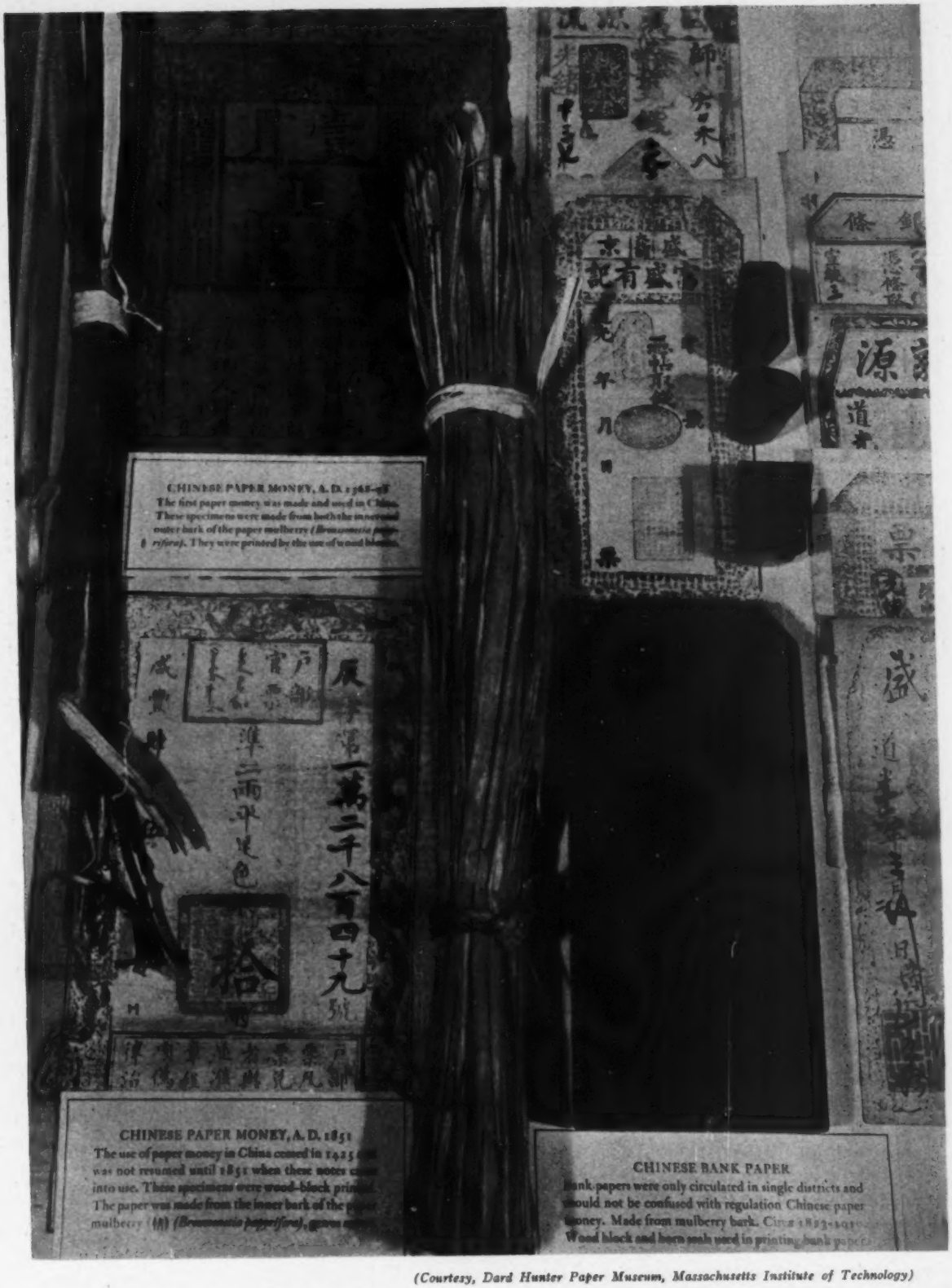
Congressional Record requirements alone are enough to keep any ordinary plant busy. As previously observed, the Record varies according to the pressure of Congressional business. One Record, it has been stated, contained as many text pages as appear in this 75th Anniversary Number of the PAPER TRADE JOURNAL, minus advertising.

So it is easily seen that the Government Printing Office is no small affair, no side issue. It is, indeed, as stated, the "Biggest Buyer of Paper."

There is no doubt, then, why the Office occupies so much space, so much detail in administration, so much intricacy in detail. It is a business in itself, and a large one. No one ever knows just when the Office may be called upon to perform some unusually large task, as in the recent war work. No one knows when the Office may be told to do this or that which shall require the enlistment of practically all its staff on one job. It stands ready, at all times, to serve the nation, and it has proven, time and again, that it can render the exact service demanded.

From the crude printing of the Civil War period, when almost manual labor was expected and performed in all departments of the printing trades, to this time, when automatic machinery does a great part of the total work, the Government Printing Office has carried out its mandate to deliver the goods. A million and one-half pounds of paper daily, during the war recently concluded, and with seemingly no limit to production, the Office managed to print what was required, day and night.

Government Printing Office is, forsooth, an institution of which the people of this country may well be proud.


CHINESE PAPER MONEY, A. D. 1368-98
The first paper money was made and used in China. These specimens were made from both the inner and outer bark of the paper mulberry (Broussonetia papyrifera). They were printed by the use of wood blocks.
CHINESE PAPER MONEY, A. D. 1851
The use of paper money in China ceased in 1425 and was not resumed until 1851 when these notes came into use. These specimens were wood-block printed. The paper was made from the inner bark of the paper mulberry (Broussonetia papyrifera), grown
CHINESE BANK PAPER
Bank papers were only circulated in single districts and should not be confused with regulation Chinese paper money. Made from mulberry bark. Circa 1823-1910. Wood block and horn seals used in printing bank papers.

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Upper Left: First Money Used in China, Printed on Wood Blocks, 1368-98; Lower Left: And a Contrast of Chinese Paper Money, as It Ceased in 1425, and Was Not Resumed Until 1851; Right, Upper and Lower: Bank Papers, Circulated in District of China, and Have no Relation to the So-Called National Paper Currency from 1823 to 1910. Wood Blocks Were Still Used in Printing This Paper, Too, With Horn Seals, and All Speciments, of the Several Centuries, Are Made of Mulberry Bark Paper

CHAPTER XXIV

Money Makes the World Go 'Round—Also the Paper

EVERY one wants money. But they would dislike to take it in all metal. Small silver, nickel, copper coins are alright, but heavy gold and silver, in quantity, is objectionable. So paper money, or simply a "promise-to-pay," has been designated, over the centuries, to take the place of skins (once a legal tender in Asia, Europe), food, such as tea, in China, rice there, also; dates, in the near-east; salt, in many out of the way places; ivory, in Africa, India; and numerous other now strange kinds of currency, once believed to be essential to the interchange of trading values.

Romans used cattle, or pecus, as they called them. From pecus we now get the Latin pecuniary, which, simply, relates to money in a grand manner. And, if the Spartans used crude iron as coinage, gradually turning to the greater valued gold and silver of the ages, it was the seventh century Lydians, B. C., however, who adopted the first real coinage in Asia. Our American Indians, thought to have Asiatic or other old country nativity, adopted the well known wampum, made of clam and whelk, because of its value, not only for coinage, but for ornamentation. Tobacco, too, with the Indians, was not only legal tender, of a sort, but the resulting colonial government of Virginia established tobacco as a legal currency for local and even intertrade use with England.

But when the final gold and silver mintage of the Romans, and of the Greeks and Egyptians, took over the currency of the intermingled peoples of the Mediterannean area, the coinage, in many cases, was also a work of art, as well as of practical passage in economic trading. Striking the coins from sheet metal, and by hand, the first issues were crude, but gradually improved as these peoples accomplished the purpose with machine stampers. To China, though, as with the origin of paper, also, goes the distinction of issuing the first paper money.

Dating from the seventh century A. D., paper money was made in China of mulberry bark. When Marco Polo (1254-1323) visited China in the thirteenth century, he saw some of this paper money, and, on his return to his home in Venice, wrote of seeing the currency. In the Paper Museum, at Cambridge, are about twenty of the notes, which are eight by thirteen inches, dating from 1368, A. D., from the Ming Dynasty, which extended from 1368 to 1644. No paper money, however, was employed in Europe, as a medium of exchange, until it was used by the Bank of Stockholm in 1668, approximately 300 years after these notes were first current.

A note issued about 1368 at the Museum reads (translated) on the back: "Great Ming Treasury Note. To be current under Heaven." There is also, in Chinese characters, the following:

"The board of revenue, having petitioned and received the imperial sanction prints, the Great Ming treasury note to be current, and to be used in lieu of metallic cash. A counterfeiter will be decapitated. The informant and captor will be rewarded with 250 tiaos of silver, and, in addition, be given the property of the culprit." In another place on the note is the name of the Emperor, Hung Wu, with the date and year the note is issued. A tiao would have been worth about 30 cents, U. S. money, so the informant would receive approximately $75.

Paper money was originally introduced to save the metal. To Dr. Dard Hunter, the most interesting thing about the Chinese paper money is that the Chinese stopped using this form of currency in 1425, forgetting all about it until 1853, when new notes appeared.

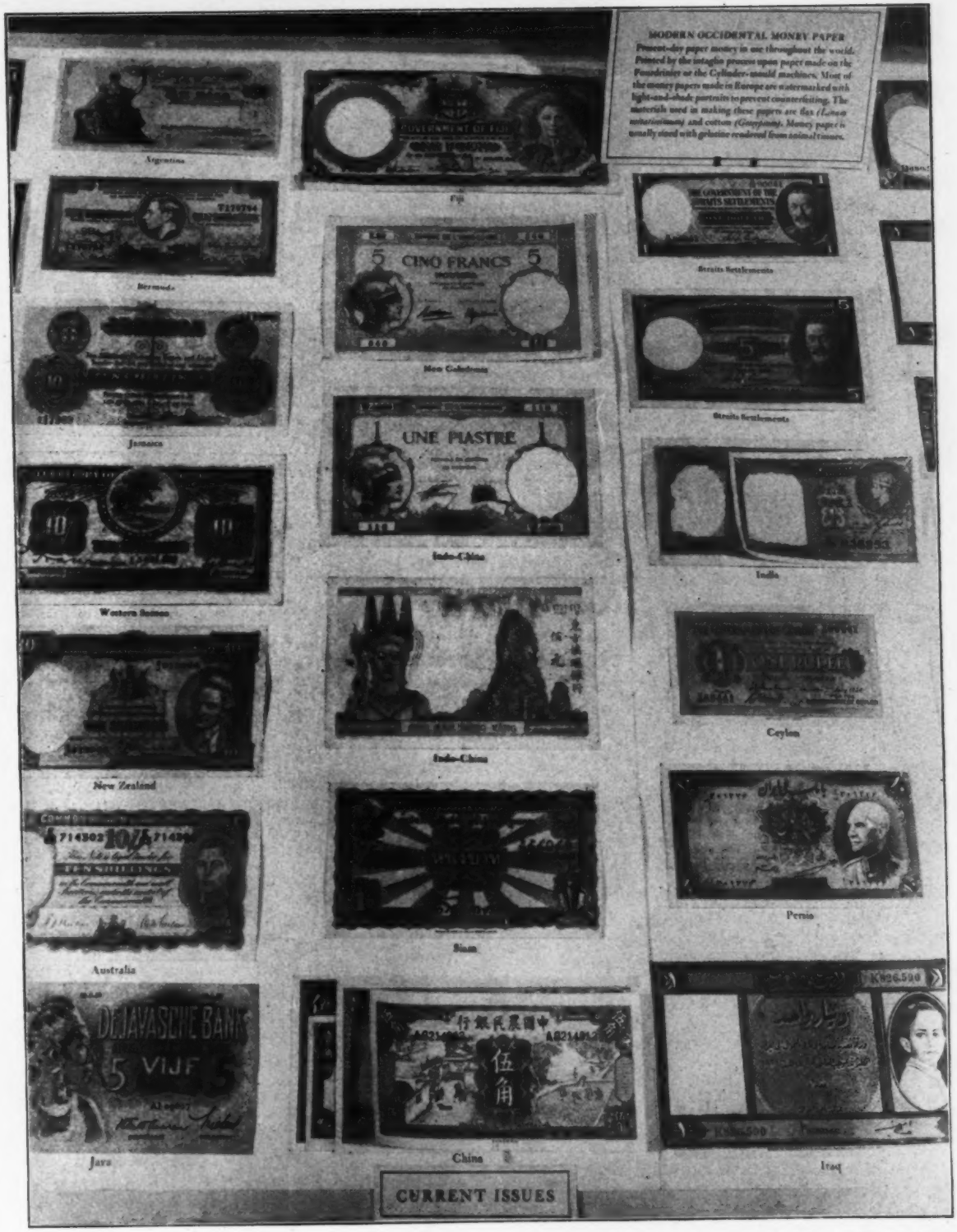
Format of this later paper money is about the same as that of the original notes, and the wording is very similar. The Ching dynasty extended from the end of the Ming dynasty, in 1644, to the Chinese Revolution in 1911. The 1853 notes, therefore, were issued during the reign of Emperor Tsien Feng, of the Ching dynasty. These notes range in value from 10 taels to 50 taels. Both the metal and paper currency are used at the present time in China.

The first paper money of the Bank of England, established in 1694, was issued, according to many well-versed authorities, in 1725. The money was made of linen and cotton on hand moulds. Denominations ranged from 5 pounds to 1000 pounds, but, after World War I, ten shilling notes and one pound were introduced. These notes are made by machine, and are watermarked.

First counterfeiting of the English bank-note was in 1758, done by raising the five-pound note to a higher denomination.

First paper money employed in America was used in 1690 by Massachusetts Bay Colony. This paper was handmade in Europe. Denominations were sixpence, from one to five shillings, and ten shillings. Some were printed in Philadelphia by Ben Franklin.

South Carolina began the use of this paper money in 1703; New York, New Jersey and Connecticut in 1709; Pennsylvania, Delaware and New Hampshire in


MODERN OCCIDENTAL MONEY PAPER
Present-day paper money in use throughout the world. Printed by the intaglio process upon paper made on the Fourdrinier or the Cylinder-mould machines. Most of the money papers made in Europe are watermarked with light-and-shade portraits to prevent counterfeiting. The materials used in making these papers are flax (Linum usitatissimum) and cotton (Gossypium). Money paper is usually sized with gelatine rendered from animal tissues.
Argentina
Fiji
Bermuda
Straits Settlements
5 CINQ FRANCS 5
New Caledonia
Straits Settlements
Jamaica
UNE PIASTRE
Indo-China
India
Western Samoa
Indo-China
Ceylon
New Zealand
Peru
Australia
Siam
DE JAVASCHE BANK
5 VIJF 5
Java
China
Iraq
CURRENT ISSUES

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

(Printed by Special Permission of the United States Treasury Department, Washington, D. C., through the Secretary of the Treasury. Further reproduction, in whole or in part, is strictly prohibited.)

Paper Money of Many Countries

Fourdrinier and Cylinder Paper Money of Current Issues from China, the Orient, the Near-East, and the Pacific Islands, with Overlapping Displays of South American and Atlantic Issues.

1723; Maryland in 1733; North Carolina in 1748, and Georgia in 1749.

In the Revolutionary period, the paper for the notes was made in this country, all by hand.

Counterfeit money, when times are good, is in circulation very little, but, when times are poor, there is more. At one time, during World War II, there was only $27,000 in circulation. But, when conditions are depressed, the flow is usually more plentiful. It is estimated that about three-quarters of a million dollars was in circulation in one of those poor years.

Paper money, as such, is merely as good as the source of issue. But it is invariably supposed to be reinforced with actual banked metal. This is not so, in many instances, resulting in the depreciation known even in this country, as "not worth a Continental," because of the over supply of such paper issued by the Continental Congress in the American Revolution.

Likewise, in the Civil War, the northern States issued an over supply of paper money, and it rapidly depreciated, but not to the eventual extent of the paper from the Confederate States, whose paper would not buy a pair of good leather boots towards the close of the conflict. It was even printed upon the backs of lottery tickets, as paper in the south was so scarce at the time.

Counterfeiters have always revelled in paper notes. They are easily made, conveniently circulated. State banks, once so prevalent in the nation, issued paper money regardlessly in times of stress, and it became necessary to refuse to accept such paper. Daily bulletins were issued by the authorities, defining the latest spurious issues, with descriptions and the numbers. Bankers rudely stamped "Counterfeit" in red ink across the face of such bills when they were presented for redemption or for deposit.

Milling of the edges of gold and silver coinage was originally adopted in many countries to stop the practice of "chipping" or "rubbing." By this process unscrupulous persons were able to retrieve considerable "millage" from coins, especially from gold, debaring its "weight" value. This Government established a gold value of 25.8 grains to the dollar, 925/1000 fine.

But current Federal Reserve notes, with ample national security in the Kentucky and West Point vaults, represented by tons and tons of the actual monetary metal (gold at $35 the ounce, Troy weight, silver at around 90c, as it fluctuates more variably than gold) has taken the place of the gold and silver dollar circulation of past years, both by Government act and by custom. Few people, except in isolated areas, desire heavy metal when they may obtain the more easily handled paper money.

In the French Revolution the depreciation of paper money, or assignats, was so rapid that they were eventually worth nothing. This has been so in many wars, even in the two world conflicts, when Germany, Hungary, Austria, Russia, Italy, were faced with such immediate depreciation that paper money would buy nothing, and whole cartloads of marks, rubles, lire, and the like, were simply used for kites or for firewood.

Yet, in this country, outside of the two instances of the Revolution and during the Civil War, the paper money of the nation has been exchanged, not only at par, but, in relation to foreign exchange (even with our friendly and reliable neighbor, Canada) at a discount.

Over a million dollars are daily made into paper money in Washington by the Bureau of Engraving and Printing. That ancient house of Crane, at Dalton, Massachusetts, has made paper for United States money for generations. It is of linen, with the usual silk threads (rayon, during the war), and it endures for about three years after printing and issue. This issue, from the period required by making the plate, takes a year. No one engraver makes the entire plate. That job is intricate, and requires the artistic and safety handling of many engravers. Geometric designs, of many patterns, of the borders of the paper, are worked up on a lathe, but the plate making is done by hand on soft or annealed steel. Then these plates are case-hardened in bone meal or by chemicals, under tremendous heat. No living man's face is ever used on American paper money. And it requires another thirty days for the completed paper to gain circulation, through the banks, after being handled by the Bureau literally fifty times, as it is counted and recounted, checked and triple checked, for errors and for faults of any kind.

That seal you see on paper money says: "Thesauri Americani Septentrionalis Sigillum" in Latin, or "Seal of the Treasury of North America" in English. Queer fact, but that seal is printed "North America," it shall be observed. That is because of the fact that this country, in the early days of the nation, hoped to make Canada a part of it, and adopted the "North America" to include the northern area above the St. Lawrence, and to the ultimate Hudson Bay and Arctic Circle, even, perhaps, to the North Pole.

When the worn out paper money is finally returned to the Treasury for redemption, it is macerated, as the pulp originally appears to make the paper at the Crane mill. Millions of dollars are thus destroyed, without a vestiage of the value remaining. Such pulp is made up into souvenirs for visiting "firemen" to the Bureau, and there sold as such.

When an owner has the misfortune to possess burned or torn bills the loss is not final, however. If the owner can retrieve less than three-fifths of a bill, or more than two-fifths of it, and forwards it to Washington, through a bank or directly to the Secretary of the Treasury, the amount of the bill is redeemed in full. Actually, thousands and thousands of dollars are thus redeemed every year. Competent experts examine the destroyed bills, usually patient women, reclaiming whatever parts they can, frequently consuming hours, even days, to match pieces of paper money that are chewed, burned, torn, or otherwise

UNITED STATES CURRENCY PAPER
OCCIDENTAL MONEY PAPER
IS MADE FROM:
MODERN JAPANESE PAPER MONEY
ORIENTAL MONEY PAPER
(Japanese)
IS MADE FROM:
Mitsumata (Edgeworthia papyrifera)
Gampi (Wikstroemia canescens)
Mulberry (Broussonetia papyrifera)
Norinoki (Abhaea rosea)
U. S. YELLOW SEAL MONEY, NORTH AFRICA
U. S. OVERPRINTED MONEY OF HAWAII
NEW CALEDONIA PAPER CURRENCY
paper money printed and issued in the Pacific island of New Caledonia, 1942, upon withdrawal from Vichy-France. The paper is a common make and the printing could be counterfeited without difficulty.

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

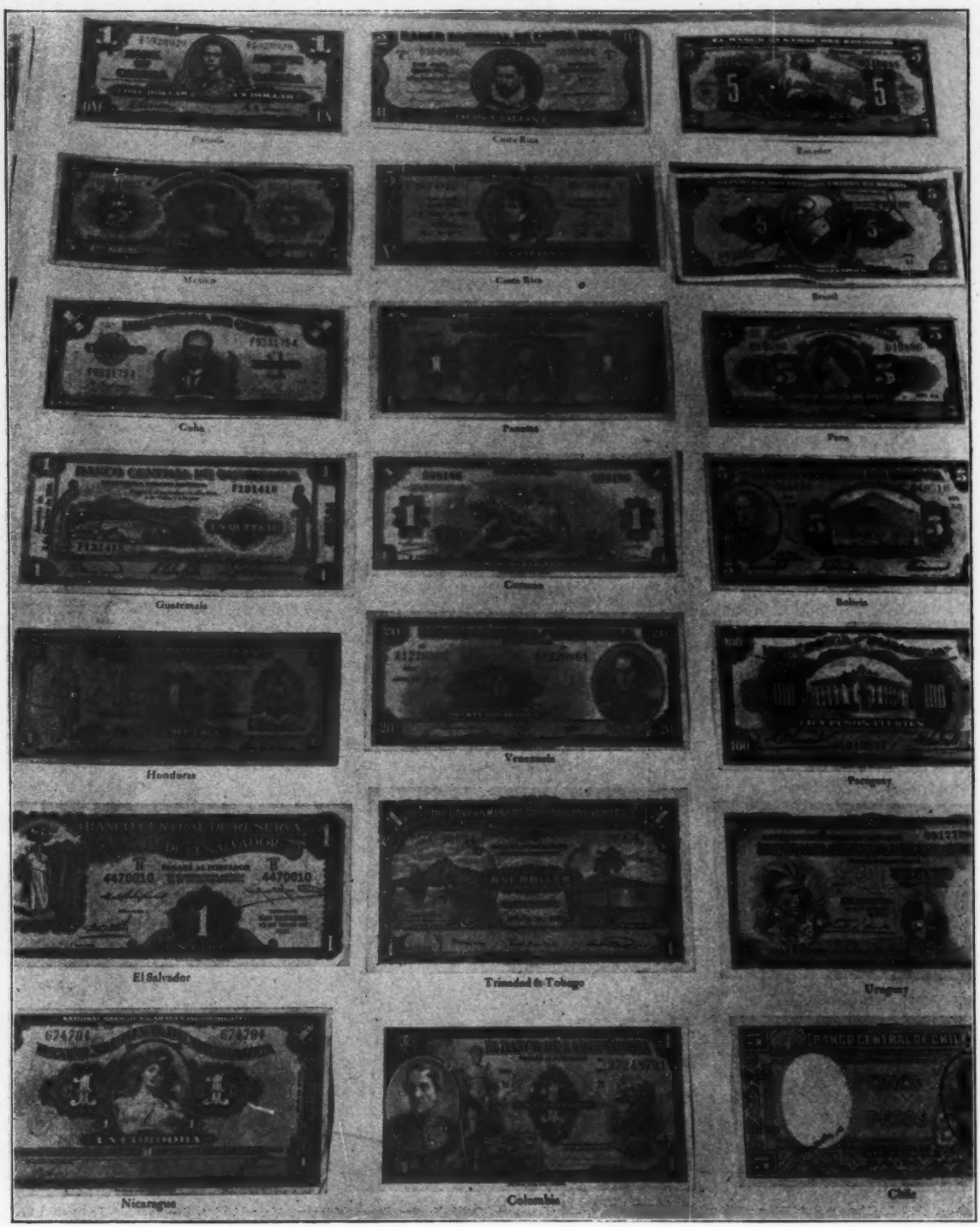
(Printed by Special Permission of the United States Treasury Department, Washington, D. C., through the Secretary of the Treasury. Further reproduction, in whole or in part, is strictly prohibited.)

United States and Other Paper Money

Left: Paper Money of This Country, Showing Ingredients; Japanese Paper Money; Center: World War II Paper Money of British and French Authority; Right: World War II Paper Money of U. S. Issue in North Africa, Hawaii, and France

in bad order. Microscopic care is used in so putting the pieces in the picture puzzle back into shape. Less than one-half of one per cent of all money issued fails to return for eventual redemption in paper, but the loss in metal coinage is much greater.

So it is easily observed that what this Government



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

(Printed by Special Permission of the United States Treasury Department, Washington, D. C., through the Secretary of the Treasury. Further reproduction, in whole or in part, is strictly prohibited.)

Our Neighbors Use Paper Money, Too

Paper Money of Canada, Cuba, Islands of the West Indies, Central and South America

issues as mere paper "promisory" notes is as standard as the valuable metal it really represents. Paper money is only paper, valueless without the seal and signatures of the issuing authorities. But, when it is once so issued, it is absolutely "good" until returned for redemption and destroyed.

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

(Printed by Special Permission of the United States Treasury Department, Washington, D. C., through the Secretary of the Treasury. Further reproduction, in whole or in part, is strictly prohibited.)

Universal Use of Paper Money

Paper Money of World Wide Circulation in Various Parts of Europe and the Near-East

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

(Printed by Special Permission of the United States Treasury Department, Washington, D. C., through the Secretary of the Treasury. Further reproduction, in whole or in part, is strictly prohibited.)

World War II Paper Money

Left: Paper Money of Italy in the World War II; Japanese Paper Yen; Right: Dutch Indies and Philippine Occupation Money, as Issued by the Japanese Government for the Pacific Islands in the War.

CHAPTER XXV

Long Rolls of Paper Make Short Rolls of Stamps

ESTABLISHMENT of the first postal service in this country is credited to the colonies of Massachusetts in 1677 and Pennsylvania in 1683, with head offices in Boston and Philaledphia. Service then established seems to have been designed to serve the individual colony, rather than the American colonies, as a whole. The following account of the colonial postal service is taken from the annual report of the Postmaster General for 1851:

"As early as 1677, upon the petition of several merchants of Boston, (Massachusetts), Mr. John Hayward, scrivener, was appointed by the Court, 'To take in and convey letters according to their direction.'

"This was probably the first post office and mail service authorized in America. Local and imperfect arrangements, for the conveyance of mails, were afterwards made at different periods in several of the colonies, until 1710, when the British Parliament passed an act authorizing the British Postmaster General 'to keep one chief letter office in New York, and other chief letter offices in each of Her Majesty's provinces or colonies in America.' Deputy Postmasters General for North America were subsequently, and, from time to time, appointed by the Postmaster General in Egland, and Doctor Benjamin Franklin was so appointed in 1755. He was removed in 1774.

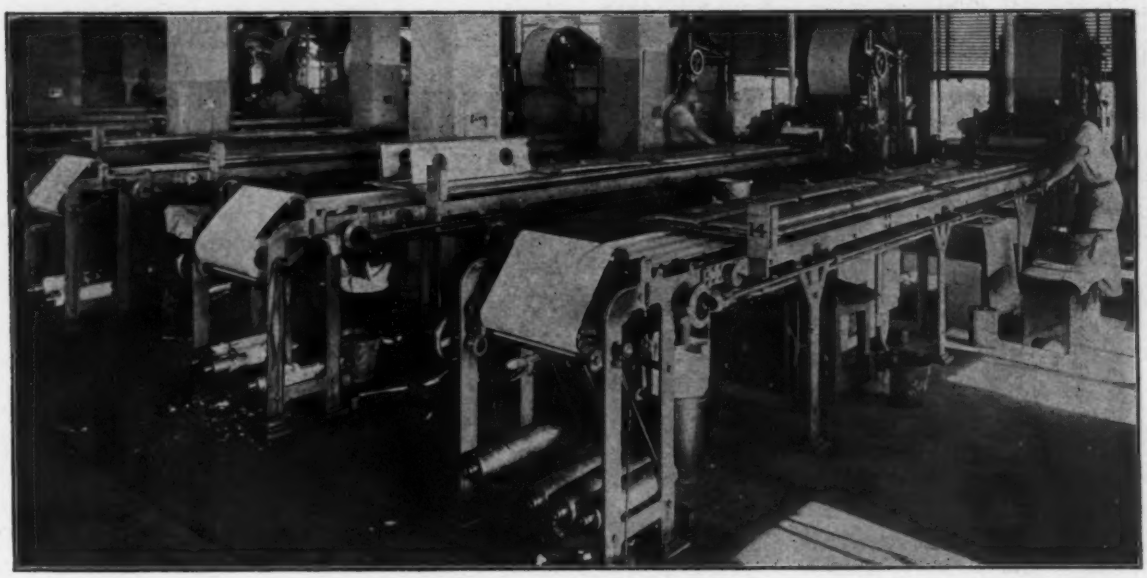
"On the 26th of July 1775, the Continental Congress determined 'That a Postmaster General be appointed for the United Colonies,' and to allow him a 'salary of one thousand dollars per annum for himself, and three hundred and forty dollars per annum for a secretary and comptroller.' On proceeding to the election of Postmaster General, 'Benjamin Franklin, Esq., was unanimously chosen.'

"The Articles of Confederation of 1778 gave to the United States in Congress assembled 'the sole and exclusive right and power of establishing and regulating post offices, from one State to another, throughout the United States, and exacting such postage on the papers passing through same as may be requisite to defray the expenses of an office.'

"The little pgrogress made during the period of the confederation shows that this power was too limited to be useful, and, when the increase of the mail service, before the adoption of the Constitution of the United States, is compared with its subsequent extension, one cannot fail to perceive that the prosperity, efficiency, and value of this department are chiefly to be ascribed to the national government founded under the Constitution of the Union."

By far the greatest source of postal revenue is from the sale of postage stamps, stamped envelopes and

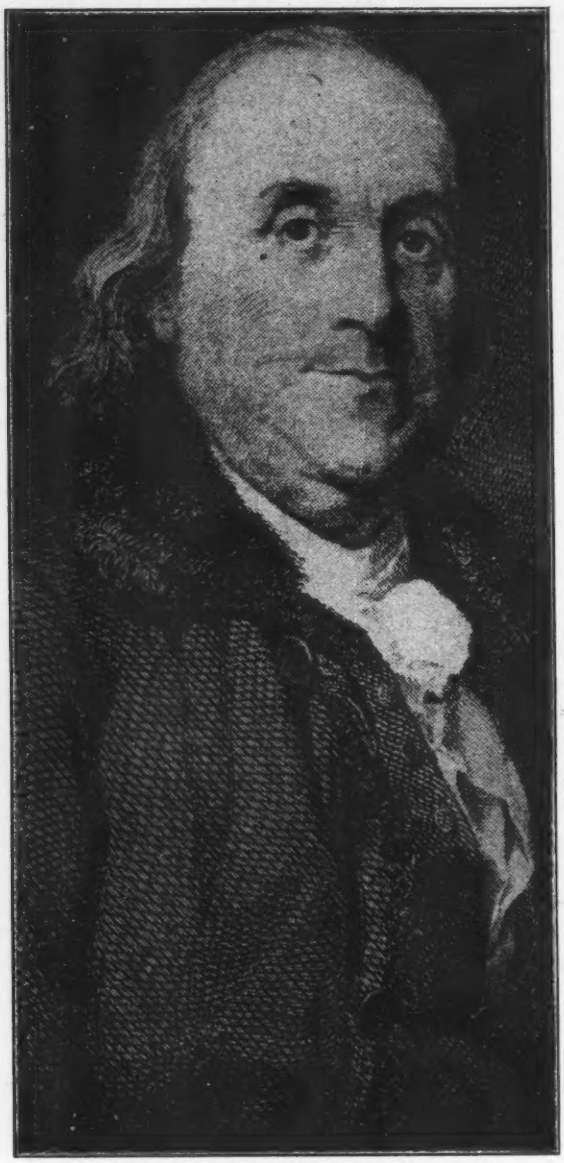
On These Long Rotary Presses the Almost Endless Sheets of Paper Come Out, Eventually, as Our Small Colored Postage Stamps



(Courtesy, United States Postoffice Department, Washington, District of Columbia)

postal cards; approximately 70 per cent of the postal receipts may be accredited to this one item.

It is probable that many persons are unaware of the fact that the use of postage stamps on mail, as evidence of prepayment of postage, does not date back to the establishment of the postal service. The issuance of postage stamps for this purpose did not begin until July 1, 1847, when they were first placed on sale at the post office in New York City, following the enactment of legislation empowering the Postmaster General to prepare adhesive stamps of suitable values to be kept on sale in post offices, and attached to mail matter in payment of the delivery charges. Prior to the adoption of adhesive stamps, the postage on mail matter was collected in money, and the amount thereof was written or stamped on the envelope or wrapper. Some postmasters had special stamps or devices for use on mail matter as evidence of prepayment of postage, and these have come to be known as "postmaster's stamps," or "provisional" issues. Some of them have a very high philatelic value, and have been sold for as much as $10,000 each.



Benjamin Franklin

Not only a foremost patriot, statesman, ambassador, postmaster-general, inventor, printer—but, also a foremost advocate of better and better paper.

Although adhesive postage stamps were made available beginning July 1, 1847, their use in the prepayment of postage was not made obligatory until July 1, 1856. During the intervening period the postage on mail matter was collected by means of both stamps and money.

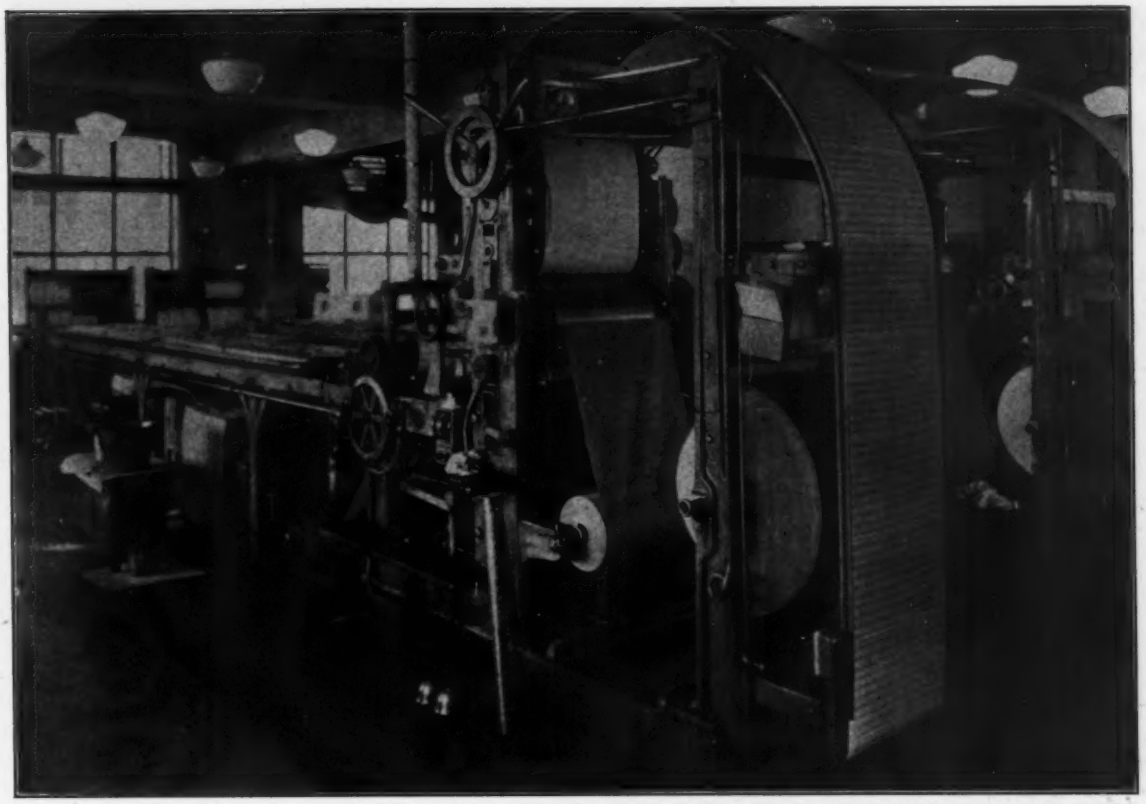
First issue of stamps consisted of only two denominations, a 5-cent stamp, bearing the likeness of Benjamin Franklin from a portrait by Longacre, and a 10-cent stamp, bearing the portrait of George Washington, reproduced from a Stuart painting. Since the issuance of the first series, the stamp designs have been revised many times, including the addition of new denominations as found necessary to meet the mailing requirements of the public. Portraits of former Presidents, and other men of prominence in American history, have been largely used as the central subjects of the regular issue.

Postmaster General has authority, under the law, to revise the postage stamp designs from time to time, as may be found desirable, including the issuance of special stamps of a historical or pictorial nature.

For convenience in classification, postage stamps are listed in three groups: (1) ordinary or regular series stamps, (2) commemorative stamps and (3) memorial stamps. First set of commemorative stamps, known as the Columbian Series, was issued in connection with the World's Fair in Chicago in 1893, and, from that date, practically every event of importance, in which the Government has participated by Act of Congress, has been recognized by a special set of postage stamps. In addition, there have been many stamps to commemorate anniversaries of important historical or industrial events associated with the development of the nation.

Famous Americans series of postage stamps of 1940 represents the most extensive single set of postage stamps of a special nature authorized to date. This series of stamps embodied 35 different stamps, bearing portraits of individuals who achieved distinction in the arts and sciences, arranged in seven groups, as follows: Artists, authors, composers, educators, inventors, poets and scientists.

A noteworthy series of special postage stamps was also issued in cooperation with the Washington Bicentennial anniversary, and placed on sale January 1, 1932. Included in this series were twelve adhesive stamps in denominations of ½c to 10c, inclusive Designs on the stamps were modeled from portraits, painted from life, by the outstanding artists of that period. Although the Washington Bicentennial stamps are classed as commemorative, they largely displaced



(Courtesy, United States Postoffice Department, Washington, D. C.)

Batteries of Great Rotary Presses Turn Plain Paper into Postage Stamps in Long Sheets

the regular issue stamps in these denominations during the period of celebration, which continued until the end of that year. In addition, a set of commemorative stamped envelopes was provided for this anniversary in denominations of 1, 1½, 2, 4 and 5-cents.

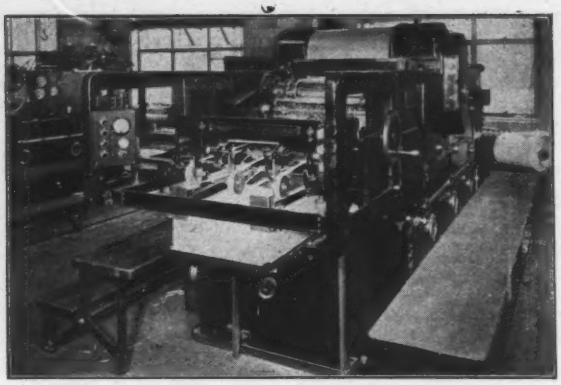
Issue of National Parks stamps of 1934 is unique in that it represents the first separate series of stamps ever authorized by the Department portraying outstanding scenic views in various sections of the country. A representative scene from ten of the Parks is incorporated on the individual stamps isued in denominations of 1c to 10c, inclusive.

A tremendous quantity of postage stamps is required each year to meet the requirements of the public, the yearly average now being in excess of nineteen billion stamps, having a face value of approximately $700,000,000. Of this quantity, not less than fifteen billion are of the 1, 1½, 2 and 3-cent denomination.

Briefly stated, when it is desired to issue a new postage stamp, either regular or commemorative, request is made of the Bureau of Engraving and Printing to prepare a model for the proposed stamp, following such suggestions as the Department may furnish, together with photographs or drawings that may be considered suitable for use as subject matter on the stamp.

The matter is then placed in the hands of a trained designer, who prepares a model for consideration. Model is in black and white, in the exact size of the desired stamp. Supplemental models may be called for until one that is deemed satisfactory is submitted. The accepted model, approved by the written signature of the Postmaster General, is returned to the Bureau of Engraving and Printing for the next step, which is the engraving of the master die by highly trained artisans. This consists of cutting the design in reverse into a piece of annealed steel from which, when completed, prints of the proposed stamp, known as "die proofs," are struck in desired colors, to be presented to the Postmaster General for final approval of the design and shade of ink to be used in the printing. After approval of the die proof, the master die is hardened by heating to a temperature of about 1400° (Fahrenheit) in a cyanide solution, followed by immersion in a brine bath. The hardened master die is then placed in a transfer machine, where, under heavy pressure, the design is entered on a soft steel roll, which, after hardening, in the same manner as the master die, is used in transferring the design to the steel plates employed in the printing of stamps.

Two styles of printing presses are used in the manufacture of postage stamps, known as the "flat plate" and the "rotary." Flat plate printing is accomplished on on power presses, fitted with four plates containing 200 or 400 stamp impressions each, depending on the size of the stamp, the operations of inking, wiping, polishing and taking the impressions being done simultane-



(Courtesy, United States Postoffice Department; Washington, D. C.)

Intricate Mechanism of the Modern Perforating Machines, With Paper Stamps Stacked Up for Those Small Dotted Holes To Be Made in Each Sheet

ously by a printer and two helpers. The printer polishes the plates, one girl feeds the press, and another girl removes and examines the printed sheets. These presses have a capacity of approximately 4,000 sheets daily, or 1,600,000 stamps, if the plates contain 400 subjects.

After being printed, the sheets are coated with adhesive on a separate gumming machine, by contact with a glass roller bathed in a solution of dextrine, which forms the gum. They are then carried automatically through an electrical drying chamber, in which the gum is hardened in less than thirty seconds.

Printed and gummed sheets of 400 stamps are next fed through a rotary perforating machine that perforates the sheets in one direction, and cuts them in half. Another machine, of the same construction, completes the perforating, and cuts the halves to sheets of 100 stamps each. After rigid inspection, these sheets are carefully counted and verified, and finally made into packages for shipment to post offices throughout the country, of which there are now approximately 45,000 in operation. All stamp shipments are made by official registered mail, to obviate losses in transit.

Gum used on postage stamps is of a vegetable product, and is made from dextrine, derived from the root of the cassava plant, which grows in tropical countries. Gum is practically tasteless and free from injurious substances when the stamps are offered for sale to the public at post office windows.

At the present time, all stamps, except a few of the higher denominations and bicolored issues, are manufactured on rotary presses, which are equipped with curved plates attached to a cylinder, and print 800 ordinary size stamps at each revolution. Presses use paper from a roll, and are constructed so that the printing, gumming and drying of the ink and gum are completed automatically in one operation, the sheet or strip of printed stamps being rewound to roll form at the opposite end of the press. After the printed roll is thoroughly dry, it is fed into a special machine, which perforates the stamps in both directions, and cuts the strip to sheets of 400 subjects. Following this, these large sheets are cut to the regular size in an ordinary cutting machine. Capacity of rotary presses is approximately two times that of a flat-bed press, and, in addition, the rotary printed stamps are gummed and ready for perforating.

For collection purposes, it is desirable to have well-centered stamps. Perfection in this regard is not possible, however, with stamps like United States issues that are printed from engraved plates exclusively. This is due to the fact that the paper must be softened by wetting, prior to printing, to make it more flexible and more easily forced under the pressure of the press into the fine lines of the steel engraving, which contains the ink. The printing, from engraved plates, is, therefore, in relief, in contrast to the surface printing of typographical and similar methods. It is the tendency of wet paper to shrink unevenly in drying, and printed sheets of stamps are no exception. As there is no uniformity in this shrinkage, it is not possible to adjust the perforating wheels on the machines to take up this unevenness, which explains why our stamp issues, in their entirety, do not conform to philatelic specifications with respect to the centering.

However, the Bureau of Engraving and Printing has developed a new style perforating machine, in which the alignment of the paper is controlled by photo-electric cells, in contrast to the old process, which required hand feeding of the sheets.

In order to provide for this automatic control, register marks are engraved on the printing plates, and appear on the sheets of stamps in the form of horizontal dashes about ⅓″ long and 3/100″ wide on the left side of each sheet, as fed into the perforator. These marks, coming under the vision of the photo-electric cells, control the crosswide perforations. There is, also, a series of register marks 1/16″ wide and ¼″ long, spaced ¼″ apart in the vertical gutter. These marks, in like manner, control the lengthwise perforations. The

(Courtesy, United States Postoffice Department, Washington, D. C.)

Just So Many in a Roll—Coil Measuring Tape in the Bureau of Engraving and Printing.

"so-called" convertible plates have all of the above marks, and, in addition, a horizontal dash ¾" long and 3/100" wide, opposite the horizontal gutter on the right side of the stamp sheets, as fed into the perforator. This new method of perforating stamps has materially improved the quality of the centering, to the better advantage of collectors.

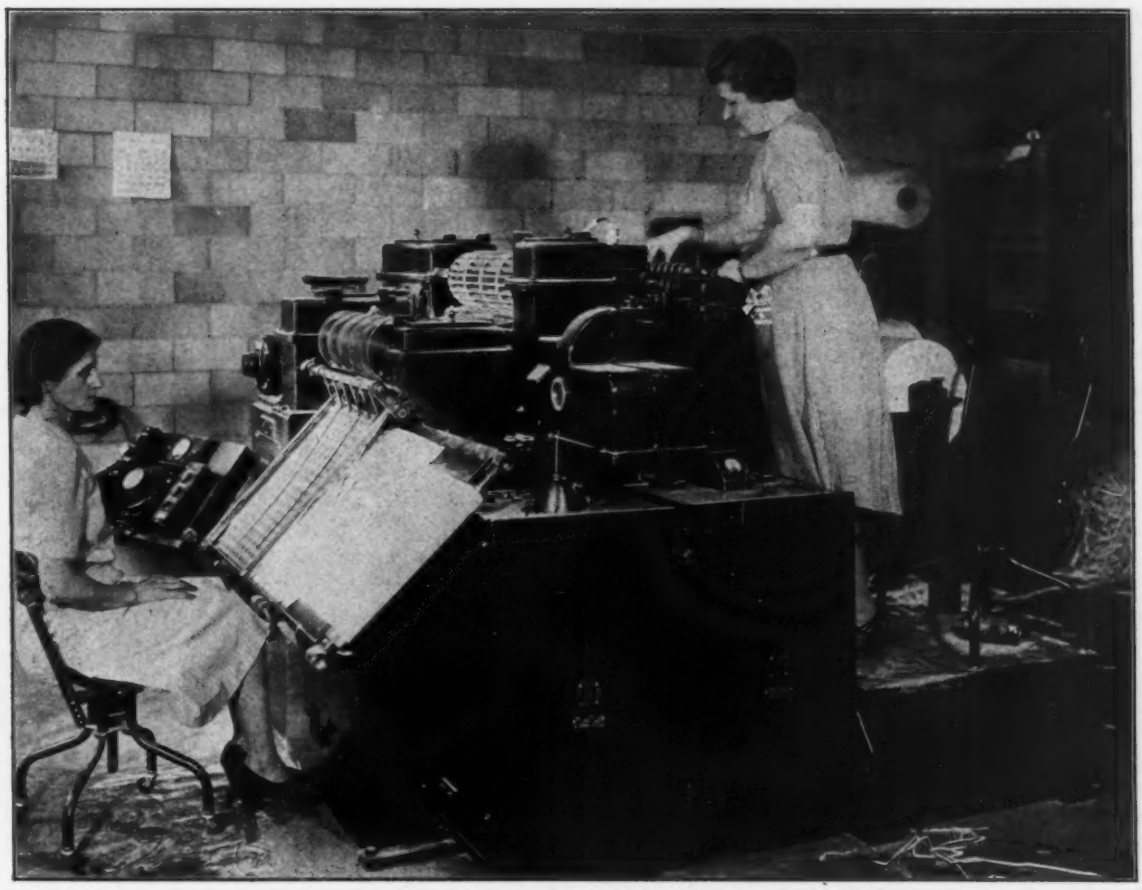
Government postal cards were first issued May 1, 1873. They are now manufactured at the Government Printing Office in Washington, D. C., by means of high-powered, modern printing presses, with a capacity of 250,000 completed cards per hour. Approximately 6,000 tons of paper are consumed in printing the yearly supply of more than 2 billion postal cards required for issuance to the postal service.

Stamped envelopes were first issued in June, 1853. Envelopes bearing the purchaser's printed return card were authorized by law in 1865. Average yearly issues of stamped envelopes are nearly 2,000,000,000, having a sale value of more than $75,000,000.

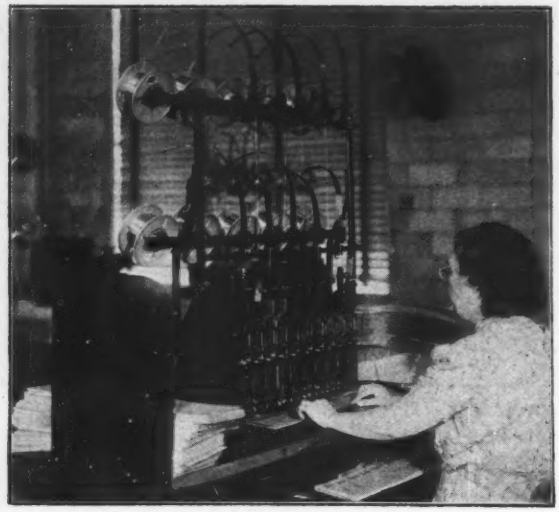
Stamped envelopes are, as provided by law, manufactured for the Department under private contract, which is let to the lowest bidder for a term of four years. For the production of the vast quantity of stamped envelopes required yearly, an extensive plant, filled with modern specialized machinery, is maintained with a force of approximately 1,000 trained employees. Largest number of stamped envelopes manufactured in a single day was 19,168,000 June 29, 1932, when the envelope factory was working at full speed to produce a large quantity of 3c envelopes needed for initial distribution to post offices throughout the country, to conform to the new rate, effective July 6, 1932.

Stamped envelopes are isued in many sizes and styles to meet the various requirements of the public. Ordinary envelopes are supplied in white, blue and amber, in two grades of paper, known as "standard" and "extra" quality. The latter envelopes have a better finish and higher bursting strength, and are, therefore, more suitable for private correspondence purposes. Envelopes with open windows, which do not require addressing, have been adopted extensively by business concerns as an economical measure, and to expedite the dispatch of their mail matter. Envelopes with distinctive red, white and blue borders have been provided for air mail letters. The colored border enables postal employes to more readily detect air mail letters when mixed with other mail.

Built by the Bureau, These Electric Eye Perforating Machines Almost Automatically Turn Sheets of Printed Stamps into Our Popular Three Cent and Other Values of Letter Stickers



(Courtesy, United States Postoffice Department, Washington, District of Columbia)



(Courtesy, United States Postoffice Department, Washington, D. C.)

Making Those Small Postage Stamp Books With a Multiple Stitching Machine

Reprint of a descriptive stamp booklet contains a description and black and white reproductions of all postage stamps from 1847. Booklet also contains an itemized list of plate numbers used in the manufacture of commemorative and air mail issues, together with the quantities printed of each series and denomination.

It has been quite a forward step in progress of mailing and of stamping to bring the Postoffice Department from the days of Franklin to the present efficiency and economy of service. Not only in the more rapid dispatch of mail, via air mail, for example, but in the almost automatic ways of handling the vast increase in bulk of service. Few people appreciate this detail and remarkable dispatch of the service from the slow Continental days to the present.

One of the early acts of the First Continental Congress was to appoint Benjamin Franklin as the first Postmaster General for the American colonies, then seeking freedom from the British Crown. The country already had a postal system, as a monthly postal service was maintained between New York and Boston. In 1683, Governor William Penn established a Post Office in Philadelphia. The same year a regular service was inaugurated, serving the entire Atlantic seaboard from Maine to Georgia.

Andrew Hamilton, of Edinburgh, Scotland, was appointed first Postmaster General for the American Colonies in 1691, when they were still under the British flag. Benjamin Franklin was appointed, in 1737, Postmaster at the Philadelphia post office, under Colonel Alexander Spotswood, then Postmaster General of the Colonies. In 1755, Franklin became joint Postmaster General for the north British colonies. Franklin was dismissed by the Crown for his sympathies with the cause of the American colonies. Thus, his appointment by the First Congress merely reinstated him, in effect.

However, the agency which today uses about 1,200 tons of paper annually for postage stamps, did not inaugurate this stamping practice for payment for carrying letters until 1847. May 17, at the special commemorative Exhibition held from that date to May 25, at the Grand Central Palace, New York City, a 3-cent commemorative postage stamp, marking the 100th anniversary of American postage stamps, was placed on sale.

This stamp is blue, of special delivery size, arranged horizontally, bearing portraits of George Washington and Benjamin Franklin in ovals on the extreme left and right. Centered between the portraits is an airplane, 4-motored, above which appear the dates 1847-1947. Below the portraits appear symbolic pony express, early type locomotive, new-type locomotive and a steamship, with the wording across the bottom of the stamp "U. S. Postage Stamp Centenary" in Gothic lettering. Other stamps, marking the anniversary, also are to be sold at successive dates.

First U. S. postage stamp is described in detail in the volume (now reported out of print) "The Postage Stamps of the United States," by John N. Luff, published in 1902 by the Scott Stamp & Coin Company, Ltd.

According to this source, the first stamp was printed on a paper that varied in type and color; the usual range from gray to dull blue, and, sometimes, on a paper that is quite white. Paper varied in quality, from thick and opaque to thin and transparent. Both have been seen with a species of watermark, says this source, a band of short, parallel lines giving the appearance of closely-laid paper.

"These lines are produced in the course of manufacturing the paper," says this volume. "They are caused by the stitches, which join the ends of the cloth bands on which the paper pulp is led from the vat."

Copies of the stamp also were known on laid paper, described as rare and only found in unused condition. Varieties and shades of the stamp have been reported on grayish blue wove paper, yellowish white wove, grayish pelure paper, and lilac-gray laid paper, says this authority.

Specifications for regular issue stamps call for stock of bleached chemical woodpulp, 65 percent sulphite and 35 percent soda, with minimum thickness .0033 and maximum .0029, with a weight of 85 pounds per 1,000 sheets, not over 7½ percent ash. No watermark is required. Present suppliers are Krocker, Burbank, Inc., Fitchburg, Massachusetts.

It is apparent that the postal business of this nation, and the total for world service, is only in its infancy, even though a century has passed since stamps were first used here. This must be so, because the annual gain in business is staggering. One New York City sub-station, right in the heart of the business district, yet in very small quarters, alone does a total cash business exceeding the entire business for postal facilities of the city of Pittsburgh, Pennsylvania.

CHAPTER XXVI

Books, Newspapers, Magazines Use Bulk of Paper

IN no country of the world are books, magazines and newspapers read so extensively as in the United States, whose people must be thoroughly cosmopolitan, if, as it has been said, "every man who reads the newspaper is a citizen of the world." In 1776, the natal year of our independence, there were, in all the colonies, but thirty-seven publications, whose total yearly output did not exceed as many thousands.

By the turn of this century, the 37 had increased to 28,806 regular daily, weekly and monthly publications, and their aggregate output was counted in the billions. This does not take into account the hundreds of thousands of books which were published in the same period of time. Since then, the numbers of periodicals, newspapers and books, which have been published, reach astronomical figures.

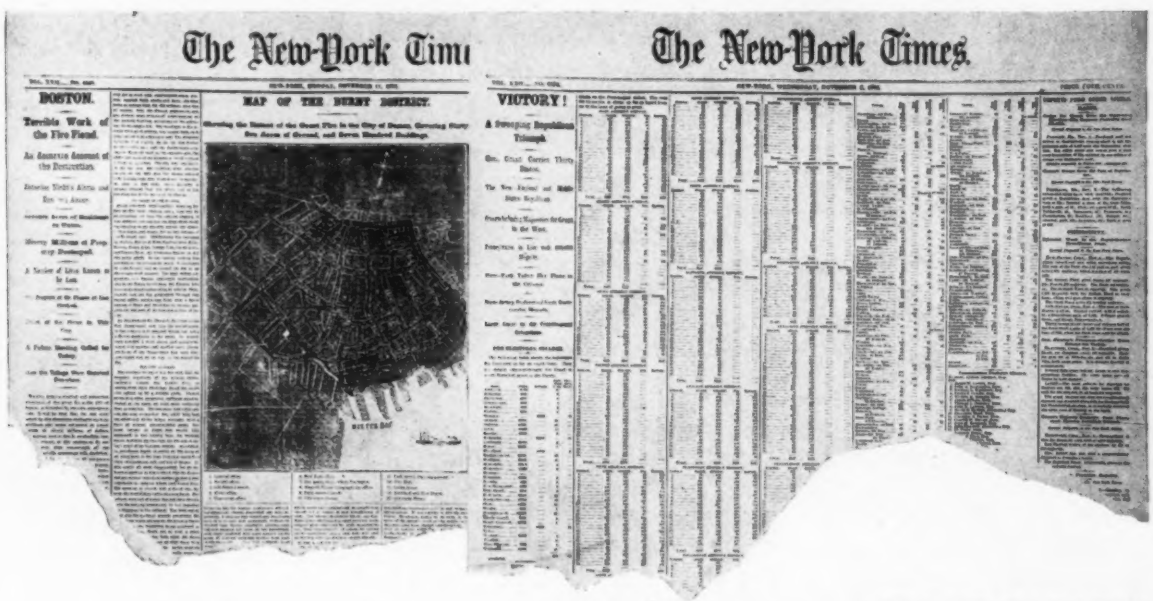
The business of manufacturing paper, as it is known in modern times, had not gained much headway in those parts of Europe whence came the American pioneers who settled in the New World in the 17th century. After 5,000 years of history, the age of papyrus and parchment was at an end, but paper, from rags, was slow in coming into general use in place of these forebears.

The American pioneer also had other problems, such as clearing land, making homes and establishing towns and villages, that he had little time, for the moment, to do more than provide shelter, clothing and food for himself and family. Soon, however, he began to realize that Europe was a great distance away, in terms of slow moving ships, so he took advantage of the many natural resources at his hands, and began to establish factories and manufactured his needs.

Paper was not yet a vital necessity. Newspapers did not exist until after 1700. There were few books, except those brought from abroad. A printing press was set up in Cambridge, in the Massachusetts Bay Colony in 1638, and others in Boston, New York and Philadelphia, before the end of the century. But the printed output was small, less than one thousand books and pamphlets in the sixty-two years from 1639 to 1700. Even the starting of the first paper mill in 1690 near Philadelphia by William Rittenhouse was not the result of any urgent call from the community, but was the result of the combination of the small needs of a single printer in Philadelphia, and the ambition of a newly-arrived German paper maker.

William Bradford, the printer, came from England to Pennsylvania for the express purpose of setting up a press in Philadelphia. Once he was started in busi-

"All the News That's Fit to Print" the Year the PAPER TRADE JOURNAL *Started*
Left, November 11, 1872, with the news of the great Boston fire; Right, November 6, of the same year, with the news of Grant's victory for the Presidency.



(Courtesy, The New York Times)

(Courtesy, The New York Times)

Old Times Building on Park Row, New York, 1857, Where It Remained Until 1888, When the Times Removed to the New Times Square Building

Sunday Times was across the street, as was also the famous Horace Greeley Tribune Building on what was then Newspaper Row, with Pulitzer's World just above the Times Building, before the World built its then wonderful dome. There were numerous horse cars,horse buses (where passengers handed their money up to the driver thru a slot at his feet, and he handed the correct change back in sealed envelopes).

ness, many books and pamphlets came from his shop, and soon he felt the inconvenience of depending for his printing upon such paper as he could bring over from Europe. Thus arose the first paper mill in America.

Probably the first mention of books written on paper's chief constituent today—wood—was contained in the Chinese dictionary, Shuo-wen, in 100 A.D., describing books written on narrow strips of wood, held together by cords, in the manner of a venetian blind. The third-century lexicon Shih Ming likens the arrangement to the teeth of a comb.

A scholar, one Ts'ui Yuan, A.D. 142, wrote, "I send you the works of the Philosopher Hsu in ten scrolls—unable to afford a copy on silk, I am obliged to send you one on paper." From this we may assume that, 37 years after Ts'ai Lun invented paper, this invention was cheaper than silk, the previously used writing material. About 300 A.D., Chinese records state that paper began to be universally accepted as a substitute as a writing material. About 150 years later, in 450 A.D., paper was generally used in Eastern Turkestan, replacing all other materials for calligraphy. The paper was made from bark and rags, with improvements in sizing with pastes made from grains.

Earliest instance of text printing on paper was accomplished in 770 A.D., when the million printed dharani of the Empress Shotoku was made. The paper was made from hemp, and the blocks used in the printing were probably made from metal, stone, porcelain or wood. Some of the copies of this work are still in existence, but no printing block of the book has ever been found.

In 868 A.D., Wang Chieh printed the earliest printed book, the *Diamond Sutra.* The roll, the original form of true Chinese book, is 16 feet in length. It was first printed in Japan in 1157 A.D.

Paper Is Chinese as a Pagoda

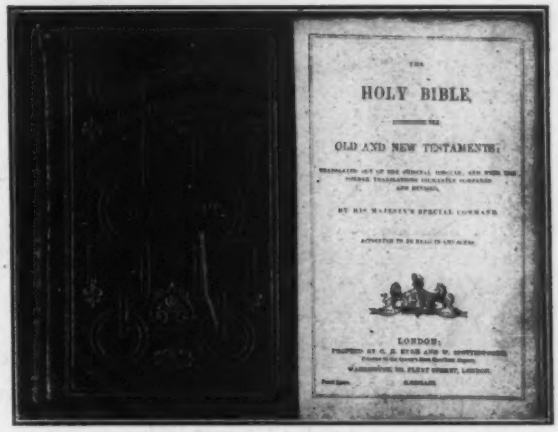
Feng Tao began his large-scale printing of the Chinese classics in the period from 932 to 953, while, about the same time, the Chinese began to make use of the first folded books. Previous to this period only rolled books had been used in China. The block printing of Confucian classics, as ordered by Feng Tao, was completed in 953, after 21 years of labor. With this impetus, the craft of printing began on a much larger scale than at any previous time.

During the Sung Dynasty, which lasted from 960 to 1126, the highest development of printing took place, with a perfection of technical excellence which has never been surpassed. All forms of literature were printed, with much of this fine work now resting in public and private collections. One large work of the period was the printing of the Buddhist Canon, comprising 130,000 pages. Great dynastic histories were carried on during the period of the Sung Dynasty, also.

Pi Sheng invented movable type in China in the years from 1041-9. But the Chinese language, with its myriad characters, did not lend itself to the use of movable type, and, therefore, the invention found little usage in China.

The Chinese made use of the first stitched books, printed on one side of the paper with "French fold," sewed with linen and cotton thread, in 1116. Earliest of the Buddhist printed books, in Chinese and Tangut, were produced in this same year.

In 1409 the earliest known book printed in Korea from movable type was made. Eleven years later the



(From the Rachel Tryphenius Slauson Scott Collection)

An Old English Bible

Times Square, New York, Broadway and the Southwest Corner of 42nd Street

When it was called Long Acre Square in 1869. And it will be noted that news bulletins and other posters were then pasted on the curb stones, as there were few, if any, bulletin or billboards at the time. But there were gas lights on every corner, with horse car tracks in the center of the streets, and telegraph (no telephones then) poles all over the city. Finally, the burden of wiring became so great, with numerous cross arms on each pole, that they were practically borne down by their own weight, especially in Winter storms. Newsprint came to the papers flat, at that time, as that was previous to the day of rolls, or of pulpwood paper.

(Courtesy, The New York Times)

Fine Books Were Made of Fine Paper

second fount of movable type was produced in the same country, to be followed by the third fount in 1434.

During the years from 1450 to 1455, the 42-line Bible was printed by John Gutenberg. During this period the beginning of book printing in Europe, and the commencement of the use of paper on a comparatively large scale, took place. The paper used in the printing of this Bible has never been excelled for durability, and remains, today, as a monument to the papermaking craft. First use of an "ex libris," a bookplate or label printed on paper, and pasted in the front of books to denote ownership, was recorded in 1450.

In 1470, a bookseller's advertisement, issued by Peter Schoffer, is considered to be the first printed poster upon paper to be produced in Europe. Seven years later, William Caxton established his printing office in Westminster, and produced 30 books during the first three years. All of his paper was procured from the Low Countries.

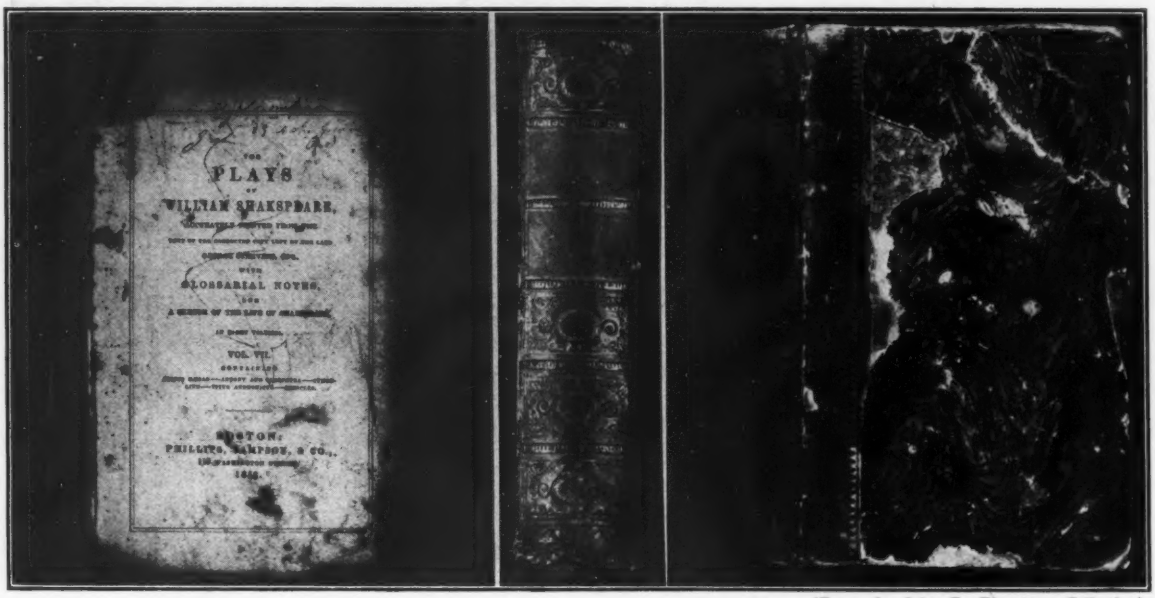
First English book, printed on paper in which colored inks were used in the illustrations, *The Bokys of Hauking* and *Huntyng,* by Juliana Berners, was printed by the unknown schoolmaster printer of St. Albans in 1486. By the following year almost every country in Europe had adopted printing. Large quantities of paper were consumed in the printing of books.

The *Nurnberg Chronicle,* a pictorial history of the world, embracing 645 woodcuts of 1,809 subjects, was issued by Schedel in 1494. Paper was used for the first time in producing a guide book, *Mirabilia Romae,* printed in Rome in 1497, by Plannck.

Earliest use of paper in Scotland for book printing was in 1508, when Chaucer's *Maying and Disporte* was printed in Edinburgh by Chepman and Myllar. Esteban Martin is thought to have excuted the first printing in Mexico in 1533-34, but no specimens of his work are available. Printed on paper imported from Spain,

Plays of William Shakspeare (Note Spelling, "Shakspeare")

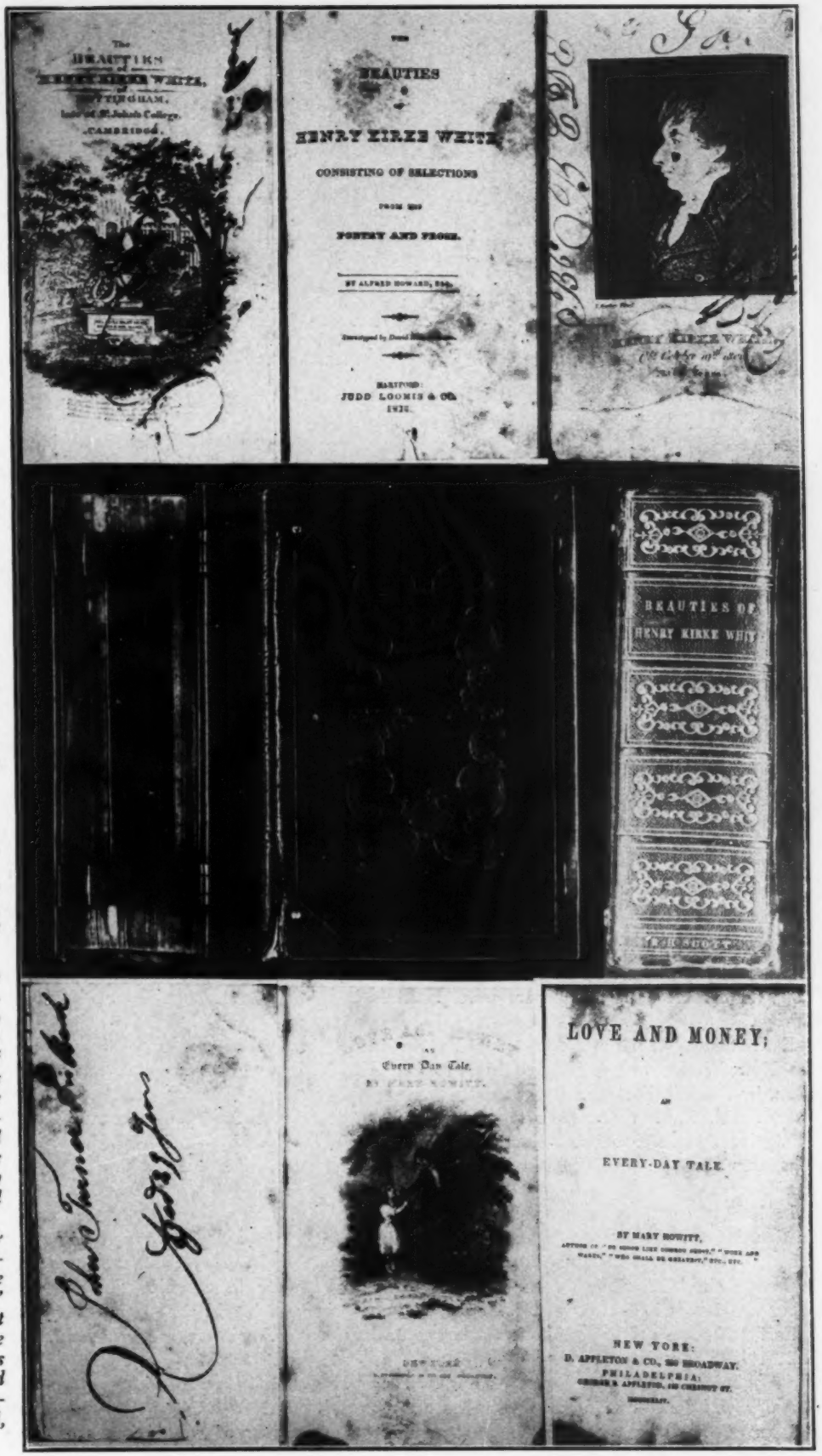
Published by Phillips, Sampson & Company, 110 Washington Street, Boston, Massachusetts, in 1852, with Wright & Hasty, 3 Water Street, Boston, as printers. Frontispiece announces: "Accurately printed from the text of the corrected copy left by the late George Steevens, Esq., with glossarial notes and a sketch of the life of Shakspeare in eight volumes. Volume VII, containing Julius Caesar, Antony and Cleopatra, Cymbeline, Titus Andronicus, Pericles."



(From the John R. Thompson Collection)

the earliest example of Mexican printing, which is known, is dated 1544. The first complete Bible in English, translated by Myles Coverdale, was probably printed in Zurich in 1535 by Christopher. First Bible to be printed actually in England dates from 1537.

Earliest use of paper in issuing a book catalog, the *Bibliotheca Universalis,* was made in 1545, when it was printed by Christopher Froschover, in Zurich. In 1563, printing was accomplished in Russia by Federov and Mstislavetz, under the sponsorship of Czar Ivan IV. A riot destroyed this



(From the Richard H. Scott Collection)

"Please Attend to Your Own Affairs, and Leave This Book Alone"

That is what it says on the German silver clasp (Left, Center) of the binding of the book, "Beauties of Henry Kirke White." But, contained in this odd volume is also the work of Mary Howitt, "Love and Money."

D. Appleton & Company, Philadelphia, published the "Love and Money" section in 1864. But the Henry Kirke White section was done by Judd Loomis & Company, at Hartford, in 1836.

(Courtesy, Editorial Department, New York Sun)

Charles A. Dana's Famous New York Sun Building in the Days of Hoop Skirts, Beaver Hats, Cobble Stones, and Rag Paper

initial attempt at printing in Moscow, but a second printing house was set up in Russia in 1589. About 1570, the earliest extra-thin papers were produced in Europe.

Earliest press in South America, and the second in the New World, was established in 1584 in Lima, Peru, by Antonio Ricardo. Paper used was imported from Spain. Earliest European type printing in the Philippine Islands, two books issued by the Dominicans, was made in 1593. Paper came from Spain, too.

In 1609, the earliest newspaper, with regular publication dates, Avisa Relation oder Zeitung, was published in Germany. First English newspaper appeared in London in 1622, while the earliest Russian newspaper was issued in that country in 1703.

Earliest known printing in Bolivia was executed in Juli in 1613. Jesuits were responsible for the work. First printing in another South American country, Ecuador, was done in 1626, and was a book embracing 700 pages, requiring considerable European paper. The edition of books was issued at Cuenca.

First printing press set up in North America was founded in 1638 by Stephen Daye, at Cambridge, Massachusetts. First printing was a broadside on paper called "The Freeman's Oath." First publication in book form was "Pierce's Almanack for 1639." John Eliot's *Bay Psalm Book*, dated 1640, is the earliest existing example of Cambridge printing.

Between 1638—when the first press was set up at Cambridge—and 1728, there were 35, or, possibly, 37, printers in the colonies, 23 of whom were in Boston, nine in Philadelphia, and two in New York. Output in those years was 3,067 books, pamphlets, broadsides.

There were also six newspapers, all published weekly: The Boston News-Letter, the earliest permanent newspaper in America, established in Boston by John Campbell in 1704; The Boston Gazette; The American Weekly Mercury of Philadelphia, the first newspaper in Pennsylvania, established in 1719; The New-England Courant of Boston; The New York Gazette, and the New-England Weekly Journal of Boston. The number of weekly issues of these newspapers, prior to 1728, was about 3,000, making, with the books,

NORTHWEST

Pedigreed Printing Papers

ALWAYS MAKE GOOD PRINTING BETTER

THE NORTHWEST PAPER COMPANY . . . . CLOQUET, MINNESOTA

THE NORTHWEST PAPER COMPANY

CLOQUET, MINNESOTA

MINNEAPOLIS 2 - FOSHAY TOWER • CHICAGO 6 - 20 N. WACKER DRIVE

SAN FRANCISCO 8 - 391 SUTTER ST. • ST. LOUIS 3 - SHELL BUILDING

PRINTING PAPERS

NORTHWEST BOND
NORTHWEST LEDGER
NORTHWEST MIMEO BOND
NORTHWEST OFFSET
NORTHWEST INDEX BRISTOL
NORTHWEST POST CARD
KLO-KAY BOOK
KLO-KAY LABEL
MOUNTIE BOOK
MOUNTIE OFFSET
CARLTON BOND
CARLTON LEDGER
CARLTON MIMEOGRAPH
CARLTON DUPLICATOR
NORTH STAR WRITING
POSTER

CONVERTING PAPERS

PAPETERIES
DRAWING
ADDING MACHINE
REGISTER
LINING
GUMMING
COATING RAW STOCK
CUP PAPER

ENVELOPE PAPERS

NORTEX WHITE
NORTEX BUFF
NORTEX GRAY
MOUNTIE
CARLTON

5201

PAPER EXPORT

*IS A FULL TIME JOB!**

AND OUR ORGANIZATION IS GEARED TO DO THE JOB

For over 40 years the name *de Vries* has been associated with paper among buyers in all world markets.

For over 40 years the name *de Vries* has been synonymous with the export sales of leading paper mills.

E. de Vries Company

PAPER EXPORTERS ALL OVER THE WORLD

EDVECO

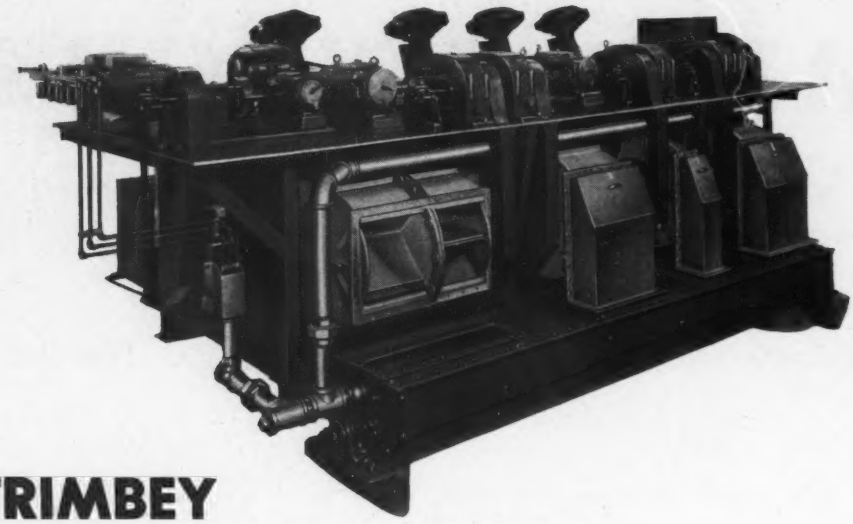
220 EAST 42nd STREET
NEW YORK 17, N. Y.

EDVECO

Cable address "Cellulose" New York

*Trade Mark

Copyright 1947 de Vries Company



TRIMBEY
CONTINUOUS
METERING AND PROPORTIONING
SYSTEMS

SAVE in FIRST COST, FLOOR SPACE, POWER AND MAINTENANCE

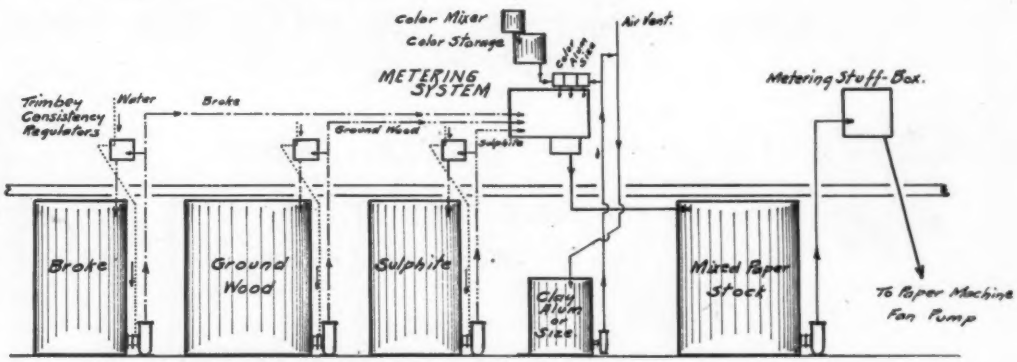
Trimbey Metering and Proportioning Systems are operating in a highly successful way in a great number of paper mills, in continuous, mechanically controlled proportioning, blending and metering of the complete paper furnish, replacing batch methods.

Without disturbing relative proportions of any of the ingredients, the rate of total output of the System can be adjusted instantly over a wide range. Proportions of any, or all, pulps or chemical ingredients can be individually changed to meet your requirements without shutting down.

Totalizing counters record the volumes of each pulp used during any given period, for cost accounting purposes.

Specific designs are available to meet your individual requirements, ranging from 10 to 400 tons per day for two or more Pulps, Color, Size, Clay Alum, etc.

In general use in newsprint mills of U. S., Canada and Europe since 1920. Systems are now in use on Ground Wood Specialties, Book, Tissue, Building Board and Roofing Felt.



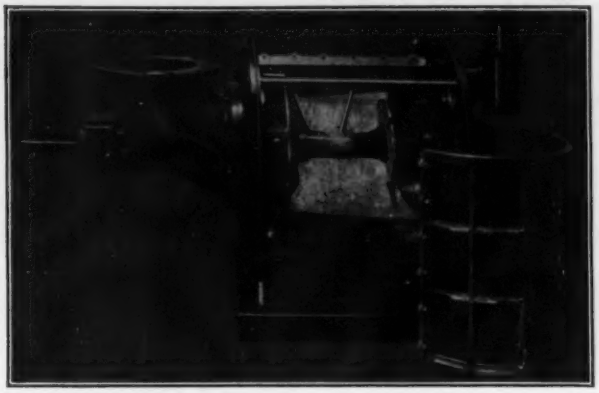
TRIMBEY DIRECT-ACTING FLOAT VALVES

★ Clog-proof—Self-Cleaning
★ Simple in Construction
★ Flow Control Valve—No Tight Shut-off

Useful for controlling levels in Thickener Vats, Washer Cylinders, Tanks and Stuff Boxes.

SIZES
3"
4"
5"
6"
8"

TRIMBEY CENTRIFUGAL PULP SCREEN



Rotating element consists of two one-piece Everdur bronze castings keyed to the shaft. Screen is furnished with machined bronze screen plate frames supported by RE-PLACEABLE bronze machined end rings. SKF Self Aligning Roller Bearings are used.

This completely submerged type of Centrifugal Pulp Screen allows screening at HIGH CONSISTENCIES and delivers the accepted stock at a point 2 feet above the center line of the screen. The rejects, which run from 5 to 12 percent, are raised 3 to 5 feet above the center line of the screen, permitting the Tailings Screens to be located at the same height as the Primary Screens and to be fed automatically without pumping.

The pulsating action of the screen automatically cleans the plates WITHOUT SHOWERS.

The large clearance and self-cleaning action reduce plate breakage and deliver CLEAN stock.

Typical Capacities per 24 hours, using 30-37 H.P. Speeds 420-475 R.P.M.

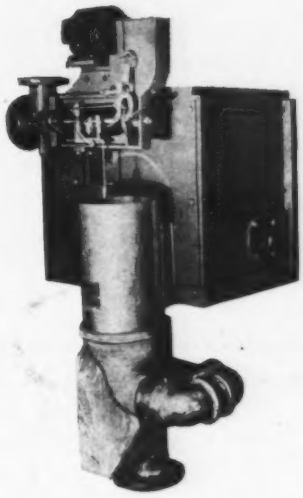
News Grade Sulphite	.055"	20 - 30
Ground Wood	.065	30 - 35
Old Mixed Papers	.110	50
Soda	.050	75
Kraft	.090	50 - 70
Insulating Board	3/16"	50

TRIMBEY CONSISTENCY REGULATORS

Centrifugal Pump Type

These regulators automatically control pulp at densities from 2 to 5 percent, allowing a *maximum* variation of 1/10 of 1 percent consistency, plus or minus. They are sensitive to changes of consistency of 2/100 of 1 percent. The regulating action is automatic, independent of the tonnage handled. The Regulator is suitable for use with centrifugal pumps. The basic principle is a change in the friction head corresponding with changing consistencies, controlling the amount of thinning water added at the suction side of the pump. This engages a fork-and-ratchet mechanism controlling a motor-driven water valve.

For consistencies from 2 to 3¼ percent, the friction cylinder is 8 inches in diameter, with a 2½ or 3 inch outlet, requiring a supply of 35 gallons per minute. For consistencies from 3½ to 5 percent, a "Heavy Density" design with a friction cylinder 10 inches in diameter and a four inch outlet is used, requiring a supply of 75 gallons per minute.



TRIMBEY WEIGHT REGULATORS

The Trimbey Weight Regulator is guaranteed to control weights well within trade limits. It is similar in operation to the Trimbey Consistency Regulator described above, except that a vat large enough to receive ALL of the stock delivered by the pump is furnished, whether the pump is centrifugal or plunger type. Dilution water is added directly to this vat, and is mixed thoroughly with the pulp by passing over a system of baffles.

TRIMBEY WEIGHT REGULATING STUFF BOXES

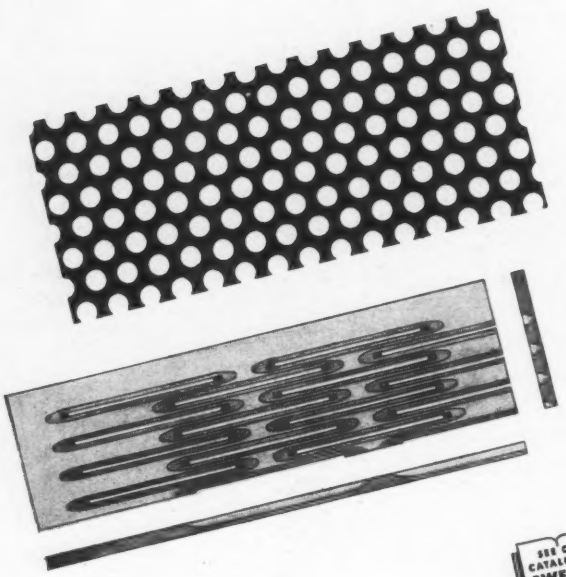
For Paper Machine productions of 20 tons or more per day, the machine stuff gate can be supplied as an integral part of the Regulator.

TRIMBEY MACHINE WORKS

GLENS FALLS, N. Y.

over
70 years' experience
in perfecting
Perforated Metal Screens

★



★

Seventy-two years ago Eli E. Hendrick began the manufacturing of perforated metal screens, in Carbondale, and in 1901 incorporated the business as the Hendrick Manufacturing Company.

Throughout the years the company has steadily widened its facilities, developed new production processes, built up a wealth of practical technical knowledge, and continually broadened its field of service.

Every Type of Screen
for Paper and Pulp Mill

Hendrick makes every type of screen required in paper and pulp mill operations, fabricating perforated metal screens in stainless steel, Monel, Inconel, Everdur, bronze, brass and copper.

With an unsurpassed equipment of tools and dies, Hendrick offers an exceptionally wide range in standard sizes and perforations, and in gauges of metal. When required Hendrick will also fabricate screens to specifications to meet special needs.

Where a fine slot combined with ample strength to withstand heavy loading is needed, Hendrick Milled Slot Screens are particularly suitable. They are used specially for rotary screens. Slot widths range from .01" to 3/16".

Hendrick also makes stainless steel-clad tanks, special type vats, meter boxes, and perforated steel and stainless steel drums for filters. Write for detailed information.

SEE OUR CATALOG IN SWEET'S

Perforated Metals
Perforated Metal Screens
Architectural Grilles
Mitco Open Steel Flooring,
"Shur-Site" Treads and
Armorgrids

HENDRICK
Manufacturing Company
50 DUNDAFF STREET, CARBONDALE, PENNA.
Sales Offices In Principal Cities

Compliments of

SOUTHLAND PAPER MILLS, Inc.

Lufkin, Texas

After 40 years of producing

Ridgelo
CLAY COATED
REG. U.S. PAT. OFF.
FOLDING BOXBOARD

we extend our sincere congratulations to
the Paper Trade Journal
on its 75th Anniversary of service
to the paper industry.

LOWE PAPER COMPANY
RIDGEFIELD, NEW JERSEY

"WHERE *Good Connections* COUNT"

A BOY
THAT DOES A MAN'S WORK
—saving time—power—money

The ALL PURPOSE *Ball Bearing* ROTARY UNION for paper mill rolls and other steam heated cylinders is hardly more than a handful for size yet it performs a mighty job in cutting installation and service costs.

It is small because the ball bearing unit and spring loaded seal eliminate cumbersome friction-consuming parts; and because it is small it eliminates the need for complicated piping and supports. You simply screw the union into the rotating member and attach the flexible hose to the steam or coolant supply.

OTHER SAVINGS: *Saves power,* very low friction drag; *saves machine down time,* quick and simple connecting and disconnecting. *Saves maintenance,* no leakage of gas or liquid under pressure. Entirely unlike anything else in the field. Thousands already in use. Plain or syphon heads. Ask for Catalog 350.

PERFECTING SERVICE COMPANY
6140 Cottage Grove Ave., Chicago 37, Ill.
Agents in principal cities and Canada

ALL PURPOSE
Ball Bearing
TRADE **ROTARY UNION** MARK

NYCO Colors

FOR HIGH GRADE WHITES

You can depend on maximum Brilliancy, Fastness to light and Economy if tinted with

NYCO Super Blue B New
(Green shade)
NYCO Super Blue SMX New
(Medium shade)
NYCO Super Blue 2RB New
(Red Shade)
NYCO Super Violet 4R New

Also

NYCO Super Greens
NYCO Super Orange
NYCO Super Reds
NYCO Super Yellow

for Fast to Light beater dyeings and coatings.

Efficient Laboratory service or samples for practical test in the beater or on the coating machine, on request.

NEW YORK COLOR & CHEMICAL CO.

DIV. OF AMERICAN DYEWOOD CO.

MAIN OFFICE AND WORKS **BELLEVILLE, N. J.**

BRANCHES:

BOSTON HOLYOKE PHILADELPHIA CINCINNATI CHICAGO KALAMAZOO

Manhattan Roll Coverings are specifically engineered for each special job on the paper machine — Couch Rolls with sealed ends; Press and Felt Rolls; Suction Press and Extractor Rolls . . . and

RUB-ROC and MARBLEX ROLLS *feature*

special water repellent surfaces distinguished by their mottled red appearance. RUB-ROC Top Press Rolls made with Flexlastics release the sheet instantly — no pick-up, no crush — a definite aid to better paper finish. MARBLEX Table Rolls are equally effective, offering a hard glossy finish that contributes to the smooth, even lay of the pulp fibers.

Rub-Roc and Marblex will not crack. Their uniform surface qualities insure uniform paper qualities. Maintenance costs are lowered because felts and doctor blades last longer.

For all your rubber requirements in the paper mills, buy Manhattan "across the board"—Rubber Hose, Belting, V-Belts and Screen Diaphragms. (The term Flexlastics is exclusive with Manhattan)

Roll-Covering Plants at Passaic, N. J. . . . Neenah, Wisc. . . . North Charleston, S. C.

RAYBESTOS-MANHATTAN INC.

Keep Ahead with Manhattan

MANHATTAN RUBBER DIVISION **PASSAIC, NEW JERSEY**

DEPENDABLE • ACCURATE

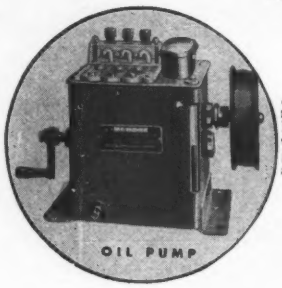
ROGERS KNIFE GRINDERS

Especially Designed and Built
for the Paper Industry

TYPE NT

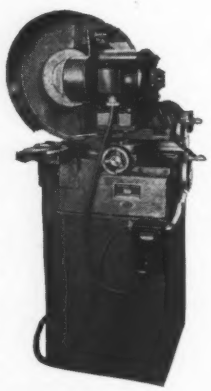
Grinds Flat or Concave—Wet or Dry

A cabinet base, precision-built grinder, designed to give you heavy-duty performance with keen-edged accuracy. Has massive bed and carriage with 5" "V" Ways, heavy backbase, quick-setting knife gauges and automatic oiling system. 7½ H.P. motor provides extra power. Results highly dependable—cost reasonable. 7 sizes: 48", 78", 90", 102", 110", 134", 160". Write for Bulletin NT.



NT Automatic Oiling System

. . . for "V" Ways and transmission bearings, an exclusive Rogers feature, protects vital working parts—assures precision grinding, minimum maintenance and long life.



ROGERS CC-3

CIRCULAR KNIFE GRINDER

A rugged, cabinet base, floortype grinder for slitters—top and bottom, from 2" to 20" diameter. Three single hand wheel adjustments are all that is needed to obtain "Rogers Sharp" accuracy. A real cost and time saver that every mill should have. Special attachment available for mounting heavy bottom slitters used on paper machines—an exclusive Rogers feature. Write for Bulletin CC-3.

Backed by over 60 years experience

SAMUEL C. ROGERS & CO.

202 Dutton Ave. **Buffalo 11, N. Y.**

ROGERS KNIFE GRINDERS
PRECISION QUALITY SINCE 1887

1848 **1948**

100 YEARS

of

Wire Cloth Weaving

Wm. Cabble Excelsior Wire Mfg. Co.

80 Ainslie St. **Brooklyn, N. Y.**

CABBLE FOURDRINIER WIRES

PARSONS PAPER COMPANY

HOLYOKE, MASSACHUSETTS

Established 1853

Manufacturers of

HIGH GRADE RECORD AND BUSINESS PAPERS FROM COTTON FIBERS

- *The*
- *World*
- *Known*
- *Name*
- *In*
- *Paper*
- *Board*
- *and*
- *Pulp*

Coordinating Division
VAN REEKUM PAPER—CENTRAL OFFICE
New York

North American Division
VAN REEKUM PAPER INC.—New York

South American Division
VAN REEKUM PAPEL S.A. COMERCIAL E INDUSTRIAL—Buenos Aires

European Division
VAN REEKUM PAPIER, N.V.—Amsterdam
VAN REEKUM PAPIER, N.V.—Amsterdam (DOMESTIC)
VAN REEKUM PAPPERS A.B.—Goteborg
VAN REEKUM PAPIR A.S.—Oslo
VAN REEKUM PAPIER G.M.B.H.—Hamburg
VAN REEKUM PAPIR A.S.—Prague
VAN REEKUM PAPER LTD.—London

Near East Division
VAN REEKUM PAPIER, ABDULLAH IZZET & CO. S.C.A.—Cairo

South African Division
COMPANY PROJECTED

Middle East Division
VAN REEKUM PAPER LTD.—Bombay
VAN REEKUM PAPER LTD.—Calcutta
VAN REEKUM PAPER LTD.—Rangoon
VAN REEKUM PAPER LTD.—Madras (IN FORMATION)
VAN REEKUM PAPER LTD.—Colombo (IN FORMATION)
VAN REEKUM PAPER LTD.—Karachi (IN FORMATION)

Far East Division
VAN REEKUM PAPER COMPANY—(China) FED. INC. U.S.A.—Shanghai
VAN REEKUM PAPER COMPANY (China) FED. INC., U.S.A.—Tientsin
VAN REEKUM PAPER LTD.—Hong Kong
VAN REEKUM PAPER LTD.—Singapore
VAN REEKUM PAPER LTD.—Bangkok (IN FORMATION)
VAN REEKUM PAPIER N.V.—Batavia

Van Reekum Paper Inc.

EXPORTERS

Sell MORE paper thru..

THE CENTRAL OHIO PAPER COMPANY

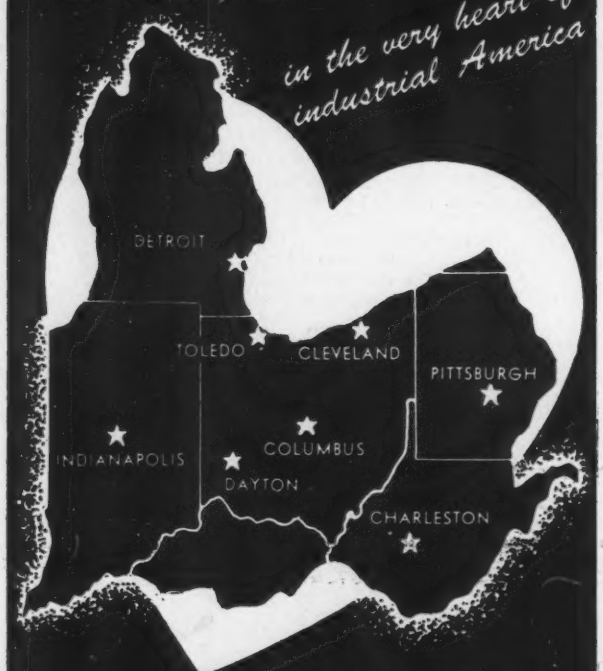
Paper Merchants and

Converters!

. . . Since 1875

Throughout the mid-west we are known and respected by the buyers and users of paper. Our compact organization can simplify your sales problem.

We can chart your course to MORE paper sales



THE CENTRAL OHIO PAPER COMPANY

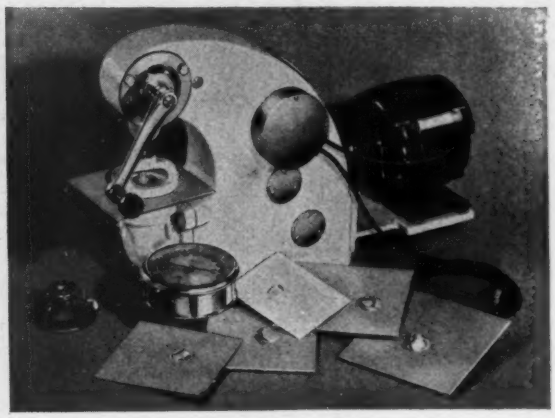
Purchasing Office

226 NORTH FIFTH STREET COLUMBUS 16, OHIO

Cady Testing Instruments

BURST TEST — WEIGH — CALIPER

for makers, merchandisers, and users of paper and boards



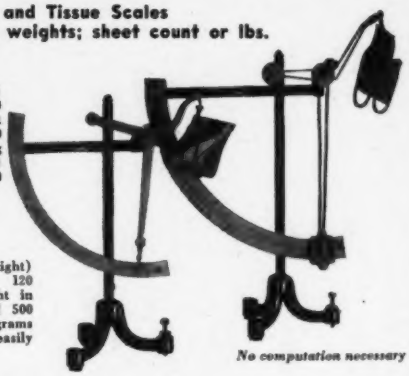
The "Cady" Tester—makes the "Cady", or Mullen, or Pop Test

This electric motor driven Bursting Strength Tester shows pressure in lbs. per square inch: *uniform* hydraulic pressure actuated by *uniform* electric power; 12 second testing cycle, unique non-slip clamp; tested area visible at all times. Mechanism sealed in cast housing, in oil bath. Meets CCC specifications. Various gauges available. Write for data.

Cady Paper and Tissue Scales verify basis weights; sheet count or lbs.

Tissue Scale (left) registers 0 to 20 lbs., shows weight for 480 or 500 sheets. Doubling weight (furnished) registers 20 to 40 lbs.

Paper Scale (right) registers ¼ to 120 lbs., shows weight in lbs. for 480 and 500 sheets; in kilograms for 500 sheets; easily balanced.



No computation necessary

Cady Micrometers measure Thicknesses . . . of papers, boards and other materials

Desk model shown has 6" diam. easy-to-read dial; 4, 7, or 12" throat; 5/16" or full ½" travel; 1/1000ths or half-thousandths graduations. Special models available for specific requirements.

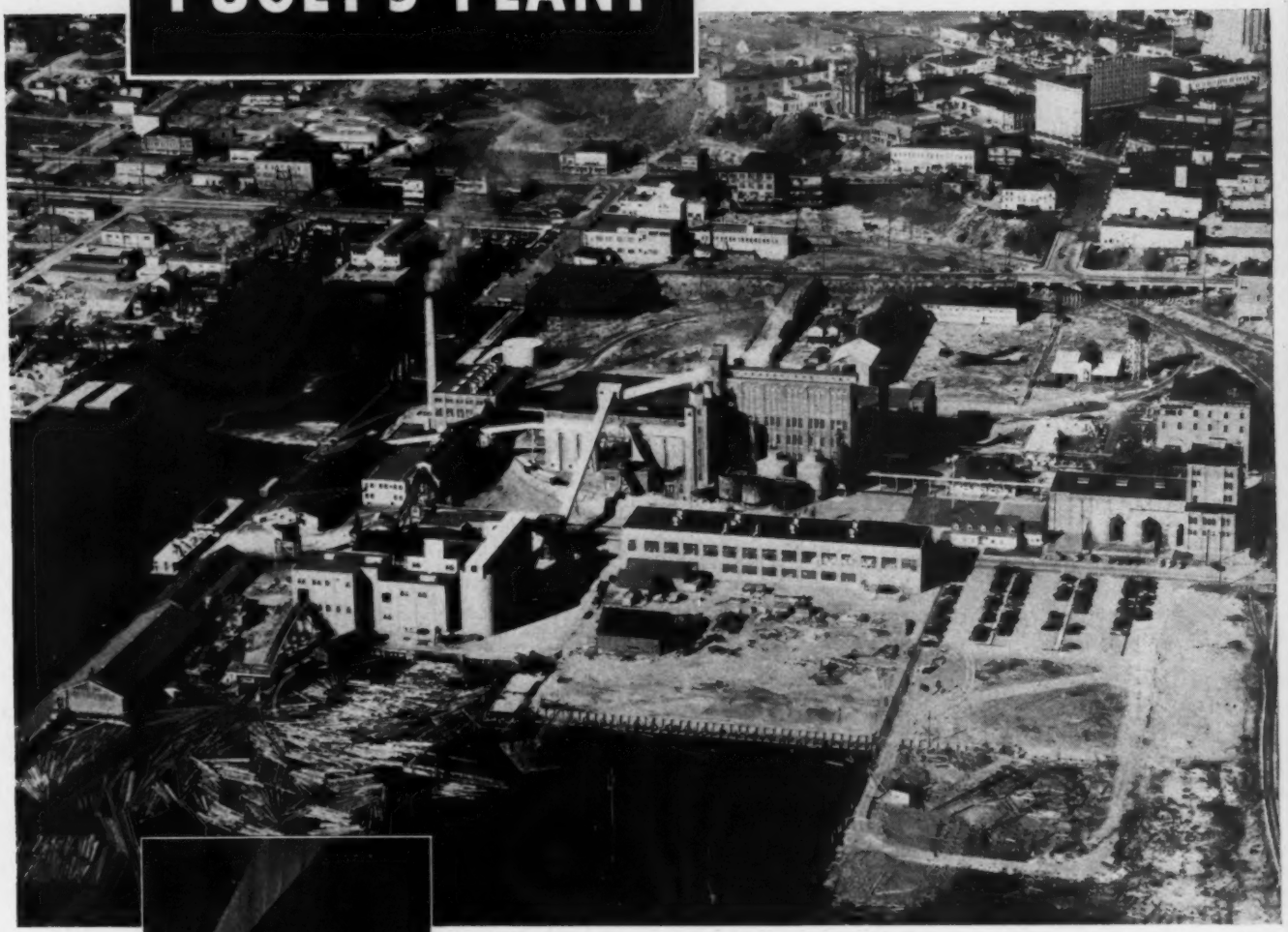
Write for complete data on Cady Instruments

E. J. CADY & COMPANY

Pioneers in the Design and Development of Paper Testing Instruments Since 1895

549 W. Washington Blvd., Chicago 6, Illinois

THIS IS PUGET'S PLANT



AERIAL VIEW OF THE PUGET SOUND PULP & TIMBER COMPANY'S PLANT IN BELLINGHAM, WASHINGTON. MODERN BUILDINGS ARE GROUPED FOR STREAMLINED PRODUCTION AND READY ACCESS TO THE LOG POND AND ADJOINING DOCKS FOR WATER SHIPMENT

AMERICA'S LARGEST PRODUCER OF UNBLEACHED SULPHITE PULP

Puget Pulp's modern plant, plus scientific control from forest to shipping dock, insures a uniform product. ✱ Puget Pulp is one of the Nation's most important sources of unbleached sulphite market pulp.

CAPACITY:
125,000 TONS ANNUALLY

PUGET SOUND PULP & TIMBER COMPANY

BELLINGHAM • WASH.

CORNELL

Specialty Paperboards and Folding Boxboards for Industrial Uses and Food Packaging

CORNELL WOOD PRODUCTS CO.

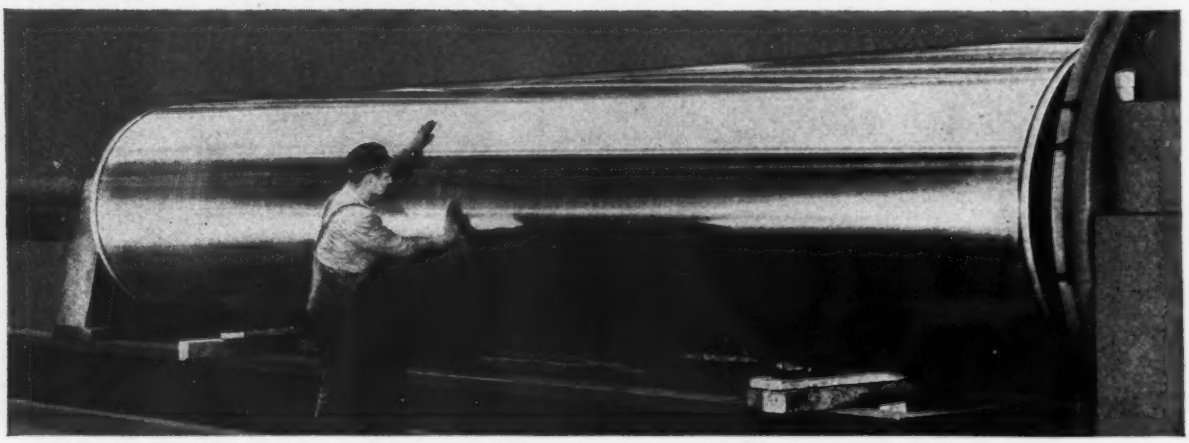
Chicago, Ill. • Cornell, Wis. • Milwaukee, Wis.

HUMMEL & DOWNING

Folding and Display Cartons, Solid Fibre and Corrugated Shipping Containers, Cleated Fibre Cases

HUMMEL & DOWNING CO.

MILWAUKEE 1, WISCONSIN



WORLD'S LARGEST CENTRIFUGAL CASTING

This suction couch roll shell measures 54" O.D. by 25' 2" length. It is symbolic of Chief Sandusky's achievement in maintaining the pace in an ever expanding, constantly progressing paper industry.

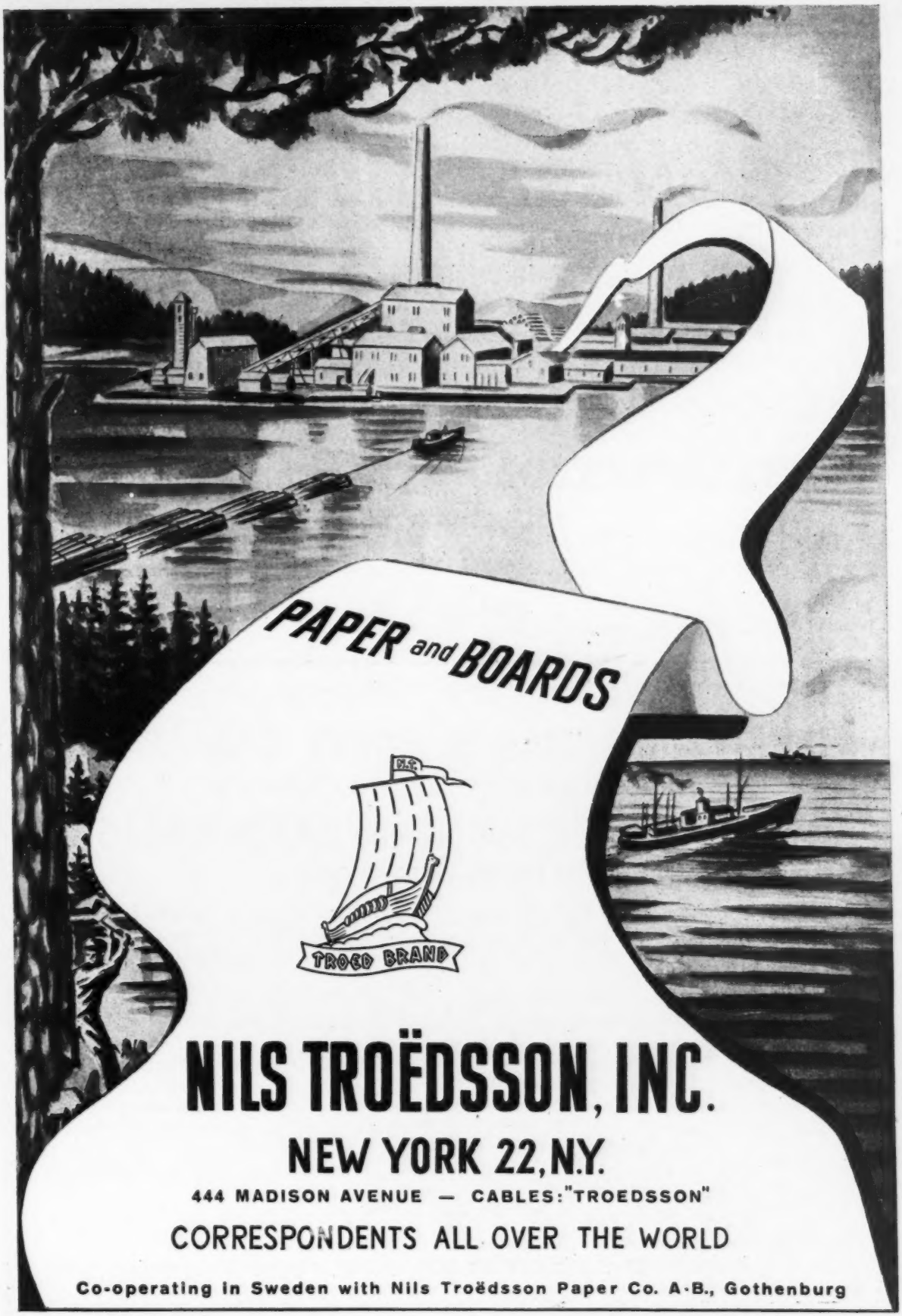
Uncompromising skill and exacting precision went into the manufacture of this "largest yet" centrifugal bronze casting . . . the same as goes into all our products . . . all the way down to non-ferrous castings as small as 2" in length by 3" in diameter.

From the midget to the mighty they are dense, uniform, and free from porosity. When ordering from your machine builder, specify the best — specify Chief Sandusky.

★ CHIEF SANDUSKY CENTRIFUGAL CASTINGS ★

SANDUSKY FOUNDRY AND MACHINE CO.

★ ★ ★ SANDUSKY OHIO, U. S. A. ★ ★ ★


PAPER and BOARDS
TROED BRAND
NILS TROËDSSON, INC.
NEW YORK 22, N.Y.
444 MADISON AVENUE — CABLES: "TROEDSSON"
CORRESPONDENTS ALL OVER THE WORLD
Co-operating in Sweden with Nils Troëdsson Paper Co. A-B., Gothenburg

CONGRATULATIONS

PAPER TRADE JOURNAL

INTERNATIONAL WIRE WORKS

FOURDRINIER WIRES

MENASHA, WISCONSIN

Established 1915

MERRITT-CHAPMAN & SCOTT CORPORATION

INDUSTRIAL CONSTRUCTION DIVISION

BUILDERS OF MODERN PAPER MILLS

FOR THE FOLLOWING CLIENTS:

Union Bag & Paper Corporation	Savannah, Georgia
Container Corporation of America	Fernandina, Florida
National Container Corporation	Jacksonville, Florida
Southland Paper Mills, Inc.	Lufkin, Texas
Champion Paper & Fibre Company	Pasadena, Texas
Bedford Pulp & Paper Company, Inc.	Big Island, Virginia
Hudson Pulp & Paper Company	Palatka, Florida
B. F. D. Division, Diamond Match Co.	Ogdensburg and Plattsburg, N. Y.
Dexter Sulphite Pulp & Paper Company	Dexter, New York
Alabama Pulp & Paper Company	Cantonment, Florida
St. Joe Paper Company	Port St. Joe, Florida

17 BATTERY PLACE, NEW YORK

CROCKER BURBANK PAPERS, INC.

Fitchburg, Mass.

Book
Coated
Offset
Label
Cover
Converting
Foil Mounting
Greeting Card
School Text
and
Industrial Papers

VALKYRIE

BERGSTROM PAPER COMPANY

Neenah, Wisconsin

Makers of VALKYRIE Book Papers

Champion-International Company

Manufacturers of

SURFACE COATED BOOK PAPERS

Coated One and Two Sides

Executive & Sales Offices - - - - - - Lawrence, Mass.

OUR FIFTIETH ANNIVERSARY

1898

1948

With 50 Years Behind Us
We See Great Days Ahead

We're Looking Backward to express appreciation to all our mills, customers and employees for their faith in us and the loyalty and cooperation they have extended to us.

We're Looking Forward to another half-century of conscientious service exclusively to paper merchants, paper converters and paper mills. We dedicate ourselves to help the industry and its allied fields to even greater progress in the years to come.

THE MUTUAL PAPER CO., INC.

510 West 27th St. **New York 1, N. Y.**

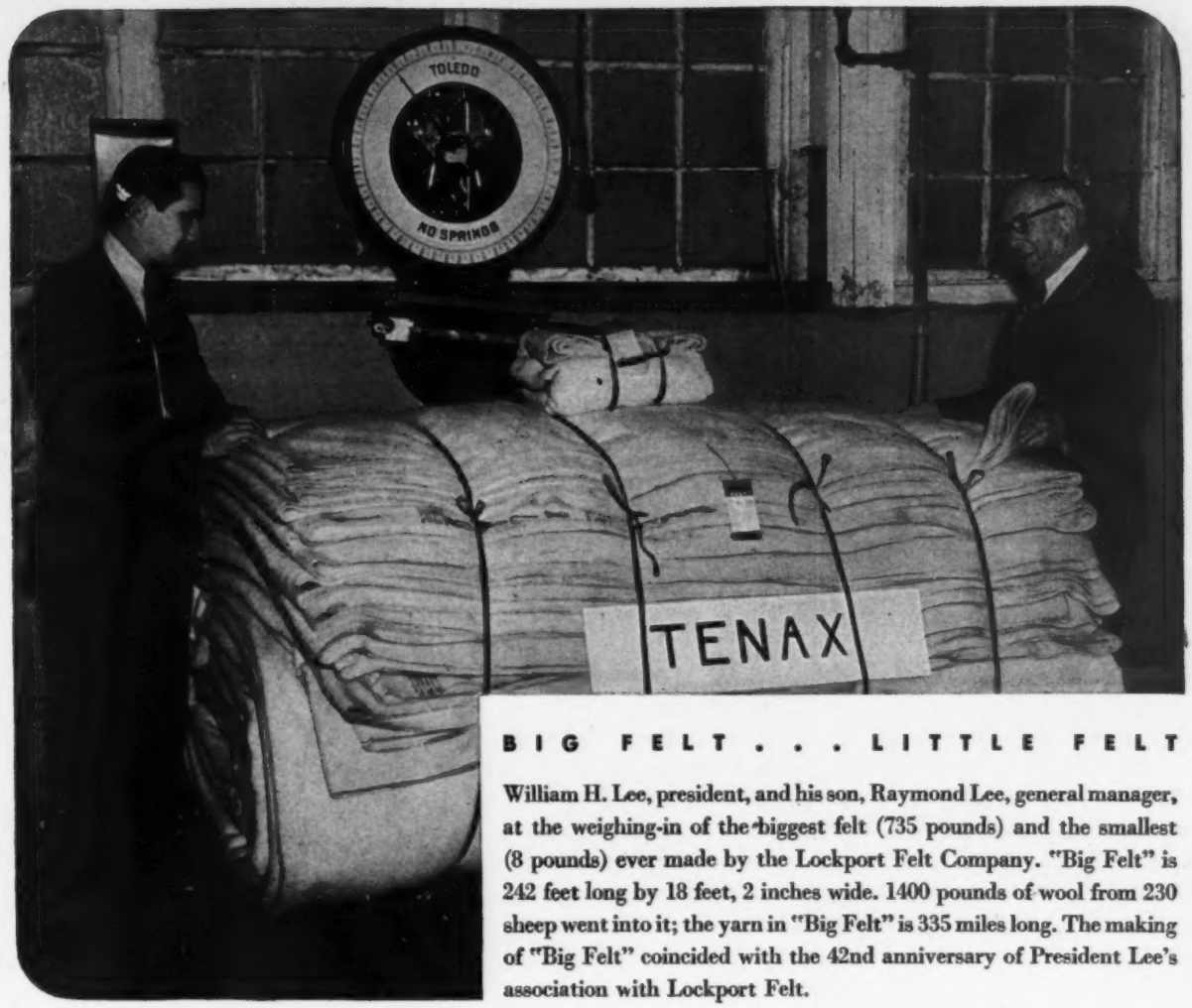
"The Service House for Paper Merchants"

CONGRATULATIONS
TO THE
PAPER TRADE JOURNAL
ON THEIR 75th ANNIVERSARY

ARTHUR SCHROEDER PAPER COMPANY, INC.
420 LEXINGTON AVENUE
(Graybar Building)
New York 17, N. Y.

(Experienced Mill Representation)

CROCKER-McELWAIN COMPANY . . . . . HOLYOKE, MASS.
MAKERS OF CERTIFICATE BOND, LAID, OPAQUE, LEDGER, INDEX



BIG FELT . . . LITTLE FELT

William H. Lee, president, and his son, Raymond Lee, general manager, at the weighing-in of the biggest felt (735 pounds) and the smallest (8 pounds) ever made by the Lockport Felt Company. "Big Felt" is 242 feet long by 18 feet, 2 inches wide. 1400 pounds of wool from 230 sheep went into it; the yarn in "Big Felt" is 335 miles long. The making of "Big Felt" coincided with the 42nd anniversary of President Lee's association with Lockport Felt.

OUR EXPERIENCE— YOUR BENEFIT IN LOWER COSTS

Our experience we pass on from father to son—the benefit of that experience, we pass on to you. For 57 years we have been gathering knowledge and the ability to choose the best wools and make them into the best felts—for you to make better paper at lower costs. For TENAX felts are tough—they have the strength of superior production, built of more than a half century of experience. These tough, long lasting felts lower your operating costs—that is your benefit of our experience.

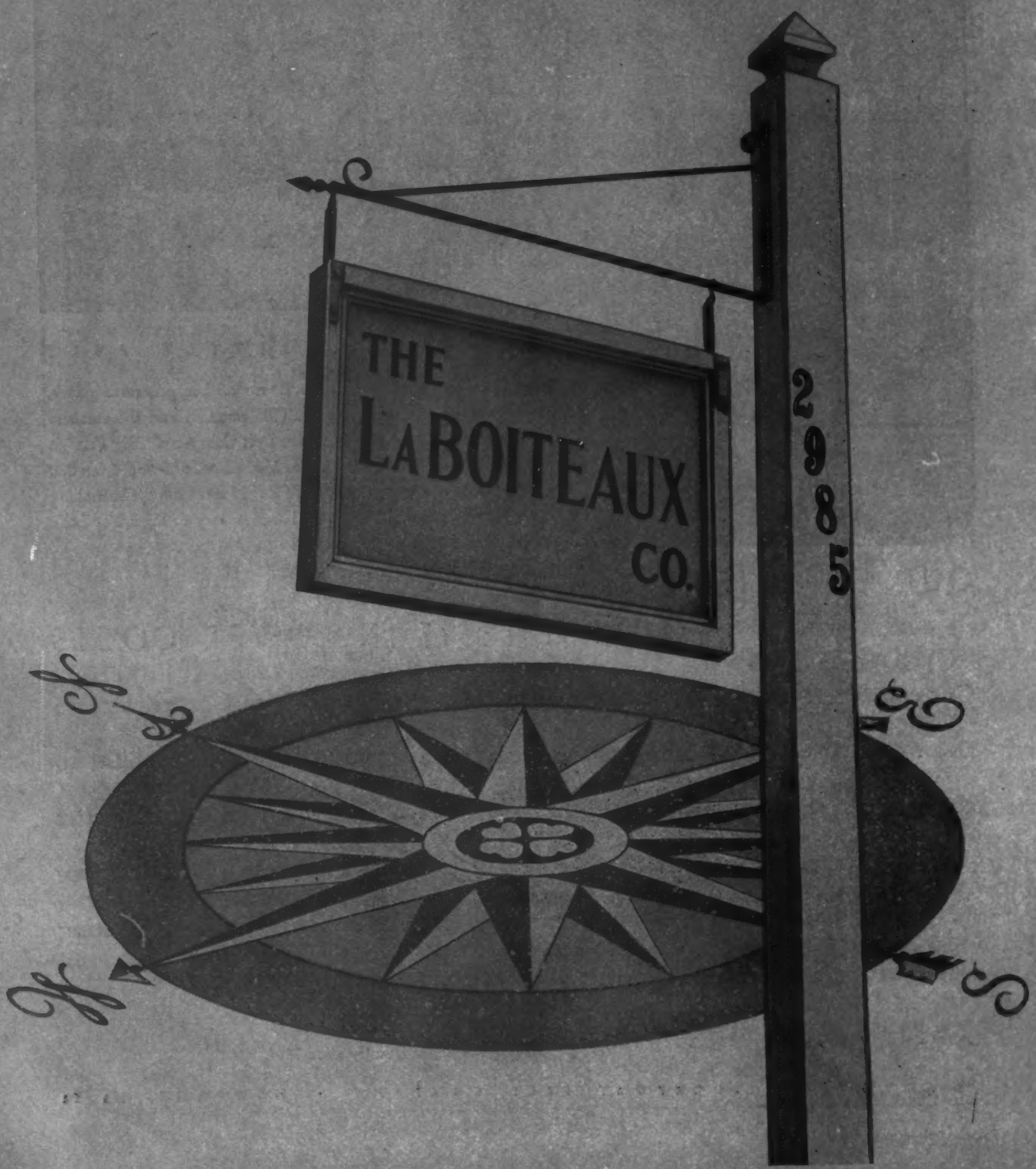
TENAX
"TENAX FELTS ARE TOUGH"

Serving the paper industry since 1891.

LOCKPORT FELT COMPANY • NEWFANE, N. Y.

from 1896 to 1948

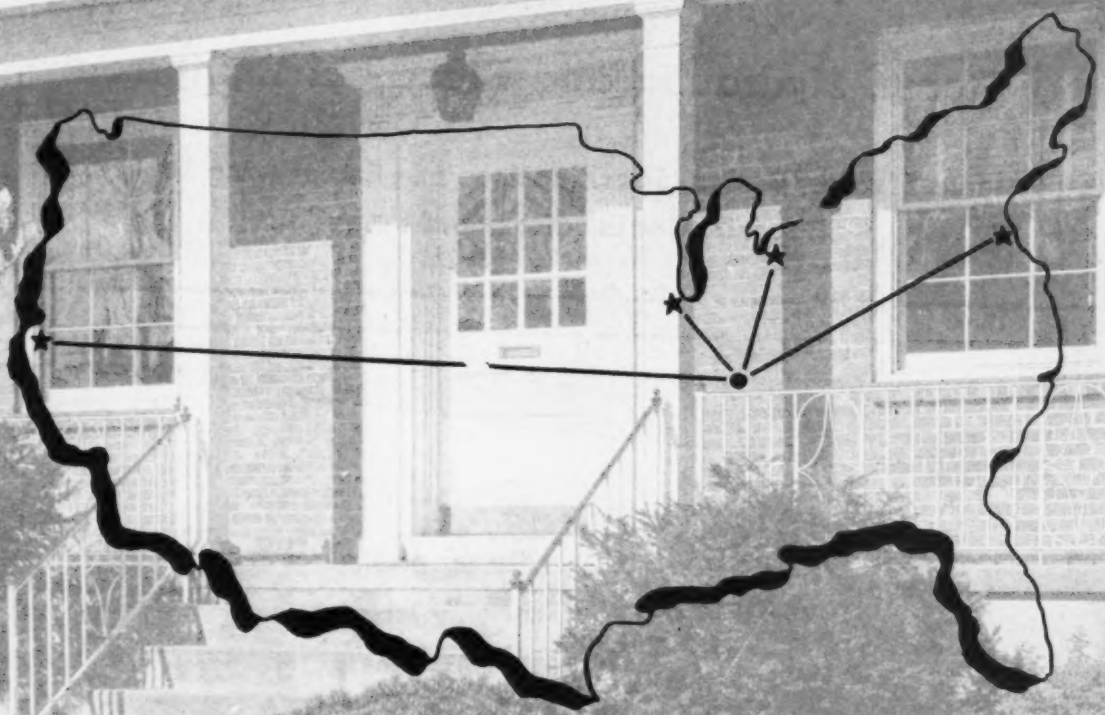
Over Fifty Years of Intelligent, Faithful Service to the Industry . . .



Coast to Coast
and World-Wide Distribution

PAPER, PAPERBOARD AND SPECIALTIES

NEW YORK • CLEVELAND • CHICAGO • CINCINNATI • SAN FRANCISCO



The Largest Distributor of Box Board in the United States

THE LA BOITEAUX COMPANY, INC.

HOME OFFICE and EXPORT DIVISION

2985 MADISON ROAD, CINCINNATI 9, OHIO

Cable Address: LABCO

CHAS. T. MAIN, INC.

CONSULTING ENGINEERS

80 Federal St., Boston 10, Mass.

PULP AND PAPER MILLS

Steam, Hydraulic and Electrical Equipment

Process Studies, Design, Specifications and Engineering Supervision
Reports, Consultation, and Valuations

Resolute Paper Product Corp.

Announces—The Removal of their Offices to

250 West 57th Street, New York 19, N. Y.
COlumbus 5-6315

Exclusive Sales Agents For:

WINDSOR LOCKS PAPER CORP.—manufacturers of toilet tissues and paper towels.
FREELAND PAPER COMPANY, INC.—manufacturers of Bogus Wrapping Paper.
JERSEY MATCH CO.—manufacturers of book matches.
DALEMAR PAPER CORP.—manufacturers of waxed and wrapping papers, cutter boxes, household packages, shredded, florists, bakers, butchers waxed papers, and gift wrapping tissues.

DISTRIBUTORS OF CAKE BOXES, WRAPPING TISSUES AND M.G. ALL SULPHITE WRAPPING PAPERS.

WE INVITE YOUR INQUIRIES

JUST TRY AND GET THROUGH A DAY WITHOUT PAPER

You want to send a telegram...
Look up a telephone number...
Read a magazine...
Order from a catalog...

Without lightweight printing papers—like those made by St. Regis—you couldn't do any one of these things that you take so for granted. The paper in a school tablet or a pack of cigarettes may well be St. Regis, too. And those lightweight pages of your Encyclopedia Britannica are one of its proudest uses. St. Regis Papers were chosen because they take print so beautifully, yet hold down bulk to a minimum.

To make paper for so many important uses, and to keep searching, as St. Regis does, for new and better ways, needs the assurance of a never-ending supply of raw material. St. Regis gets — and gives — this assurance by largely owning its own timberlands and by managing them scientifically for sustained yield.

In its 43 plants throughout North and South America, St. Regis also manufactures: Heavy-duty multiwall paper bags for shipping over 400 products... Automatic bag-filling machines..."Tacoma" bleached and unbleached sulphate pulp . . . Panelyte, the St. Regis structural laminated plastic.

ST. REGIS PAPER *Company*

230 PARK AVENUE, NEW YORK 17, N. Y.
St. Regis Products are sold by St. Regis Sales Corporation: Offices in New York • Chicago • Baltimore • San Francisco and 20 other industrial centers.
IN CANADA: St. Regis Paper Co. (Can.) Ltd., Montreal

PRODUCTS FASHIONED FROM GROWING TREES TO SERVE ESSENTIAL INDUSTRIES

Compliments

on your

75th Anniversary

S. AUSTIN BICKING PAPER MFG. CO.

DOWNINGTOWN, PA.

Woodfibre, B. C., Sulphite Mill where

BRITISH COLUMBIA PULP & PAPER COMPANY, LIMITED

manufactures fine quality Rayon Pulps
from Western Hemlock

BRITISH COLUMBIA PULP & PAPER COMPANY, LIMITED **VANCOUVER, BRITISH COLUMBIA, CANADA**

1832 1948

The Chatfield & Woods Company

Established 1832

at CINCINNATI, OHIO

AFFILIATED COMPANIES

The Chatfield Paper Corporation	Cincinnati, Ohio
The Chatfield & Woods Company of Penn'a.	Pittsburgh, Pennsylvania
Clements Paper Company	Nashville, Tennessee
The Grand Rapids Paper Company	Grand Rapids, Michigan
The Scioto Paper Company	Columbus, Ohio
The Union Paper & Twine Company	Buffalo, New York
The Union Paper & Twine Company	Cleveland, Ohio
The Union Paper & Twine Company	Detroit, Michigan

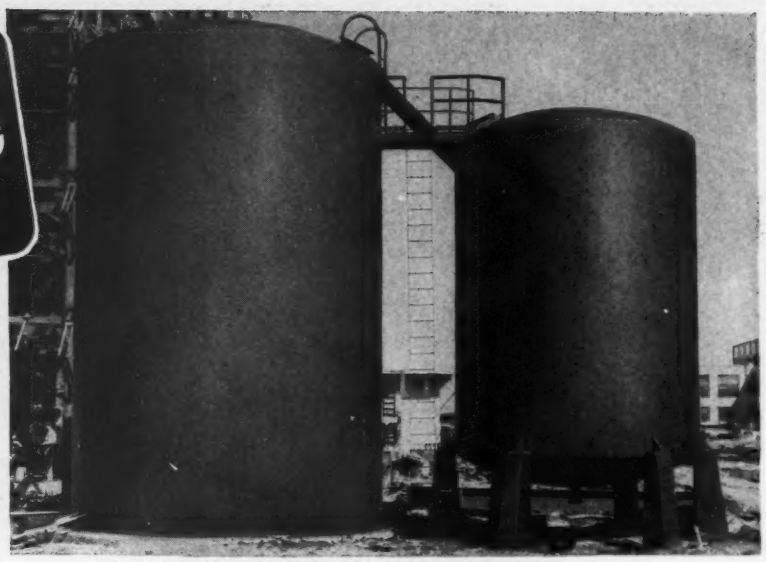
ERKOTE INSULATING MASTIC

INSULATES PROTECTS

Here is an insulating mastic that costs *less* to apply . . . *less* to maintain . . . providing excellent protection for Evaporators, Blow Tanks, Soap Tanks, Liquor Tanks and similar equipment. ERKOTE 3X INSULATING MASTIC is applied directly to the surface—saves time and money because it needs no lugs, wires or other support.

Many Sulphate Paper Mills rely on ERKOTE 3X INSULATING MASTIC because it is not affected by hot caustic liquors—and is equally effective wet or dry. Find out about ERKOTE 3X INSULATING MASTIC *before* you tackle your next insulation problem.

We also make ERKOTE 2X CORROSION RESISTING MASTIC (no cork filler) for use where paints fail around the chemical end of a paper mill.



SOAP SKIMMING AND SOAP STORAGE TANKS

Write us for further information.

Represented in the South by
W. W. HENDERSON & SONS
PENSACOLA, FLA.

EARL PAINT CORPORATION
DEPT. I • 240 GENESEE STREET
UTICA, NEW YORK

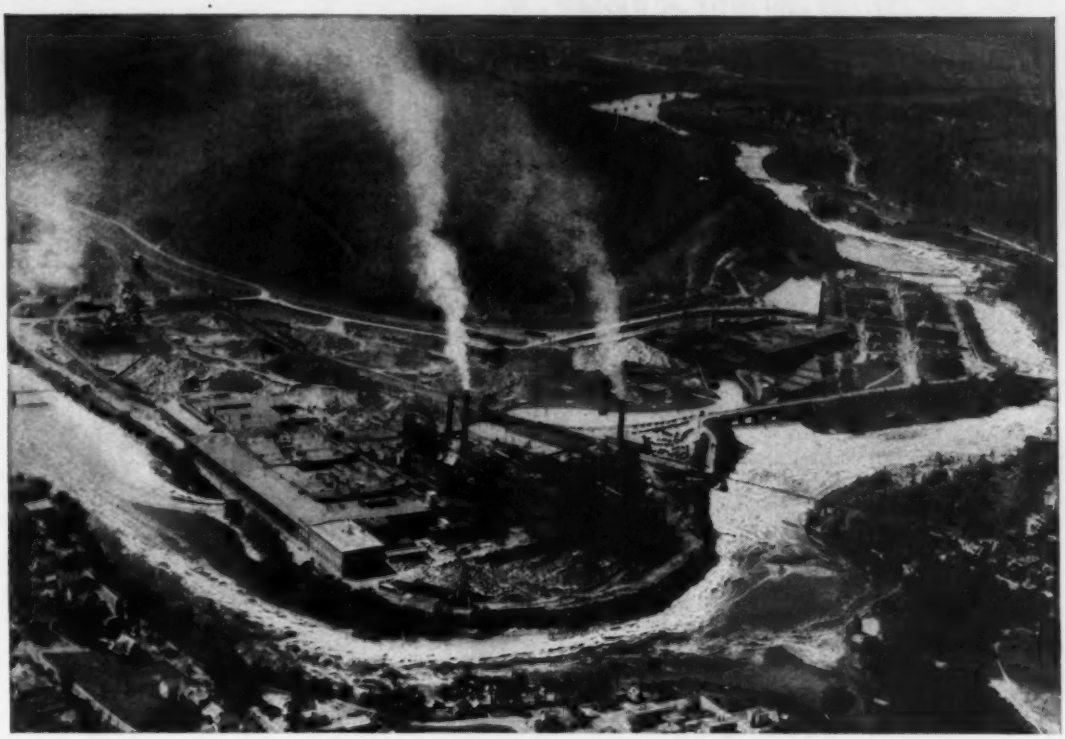
EARL PAINT CORPORATION • *Erkote Technical Mastics*

WATERVLIET

Progressive manufacturers of fine coated book papers and uncoated offset

WATERVLIET PAPER COMPANY

WATERVLIET MICHIGAN



Aerial view of the Oxford Mills at Rumford, Maine

OXFORD PAPER

COMPANY

230 PARK AVENUE, NEW YORK 17, N. Y.

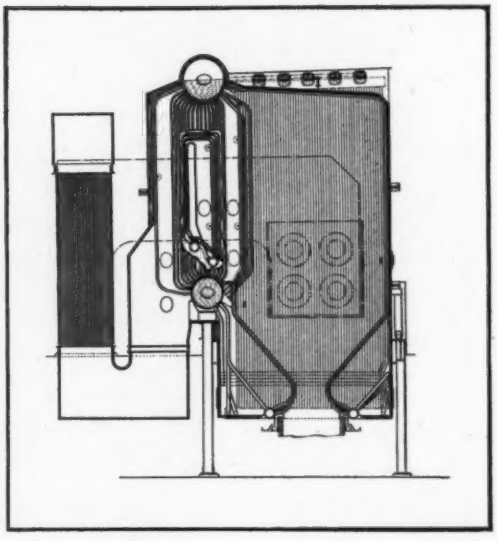
Makers of fine quality coated and uncoated papers for all types of printing and specialty papers for commercial use.

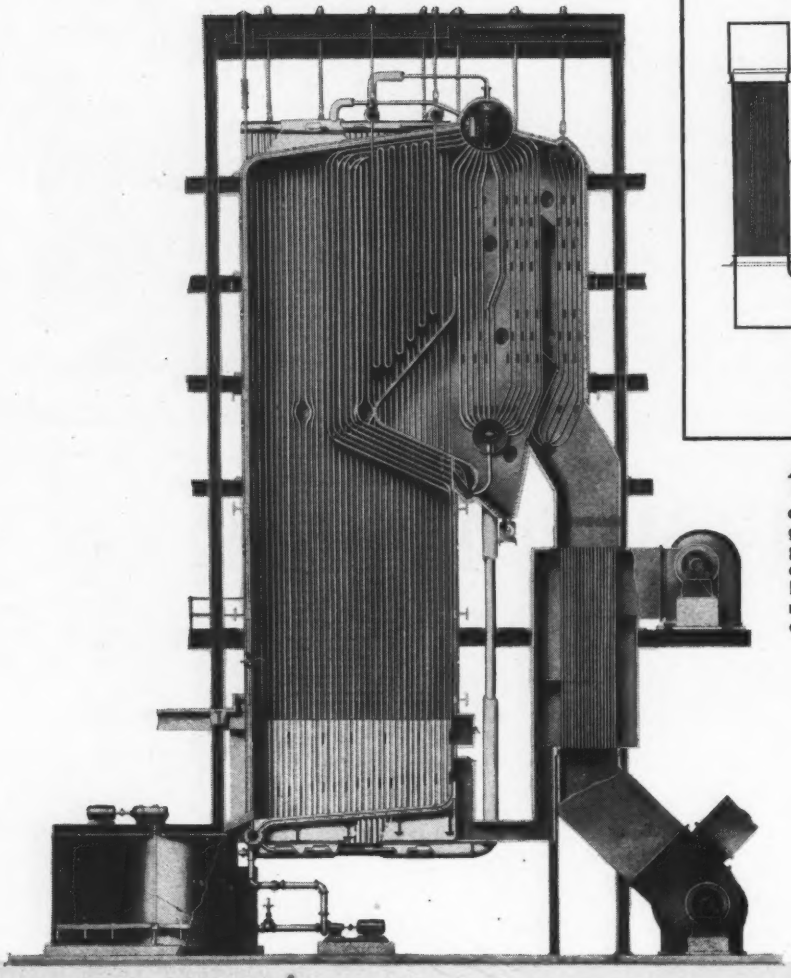
MILLS at Rumford, Maine and West Carrollton, Ohio

WESTERN SALES OFFICE: 35 East Wacker Drive, Chicago 1, Illinois

Distributors in 48 Key Cities

BABCOCK & WILCOX EQUIPMENT





BOILERS — B&W Boilers include types and sizes for dependable, low-cost steam generation in any combination of capacity, pressure, temperature, fuel, and space requirements encountered in paper mills. Integral-Furnace boiler shown above offers new installation, operating and maintenance advantages.

BABCOCK & WILCOX'S
TUBULOUS SAFETY BOILER
VERTICAL AND HORIZONTAL ENGINES.

B&W advertisement in first issue of this publication carried names of several paper mills then using B&W boilers.

RECOVERY UNITS — High chemical recovery and reduction, and maximum steam generation per ton of pulp are combined with low-cost operation and maintenance in B&W-Tomlinson Recovery Units for sulphate pulp mills. An important recent development is the application of automatic soot blowers to eliminate routine hand lancing. Other developments concern the magnesium bi-sulphide process for sulphite mills, and the Cyclone Evaporator.

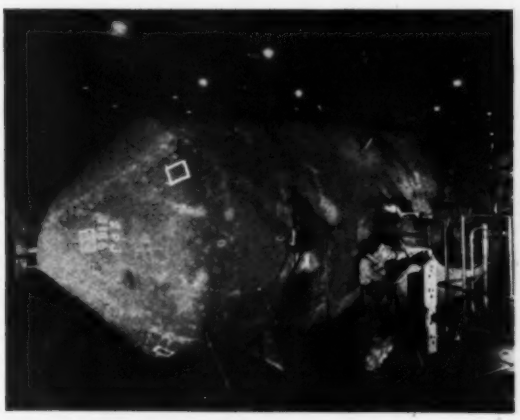
. . . working together for progress for over 75 years

FOR PULP AND PAPER MILLS

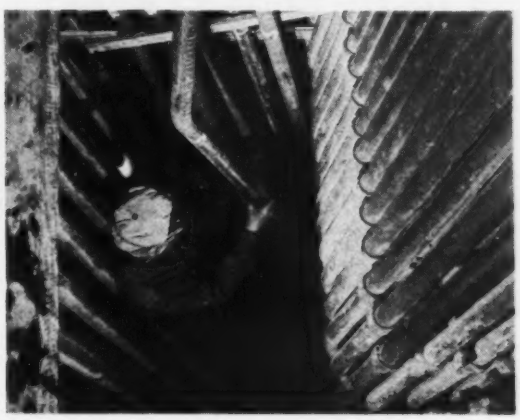
Time-Proved Aids to Low-Cost Production

The various lines of B & W equipment shown on these pages are contributing importantly to the present high standards of operating efficiency and economy now being attained in modern pulp and paper mills. Association with progress in this industry has been a continuous story with B & W for more than 75 years. This long period is dotted with developments pioneered by B & W in chemical recovery systems, steam generation, fuel preparation and firing methods, process equipment, tubular products—greatly aiding paper mill operations to improve plant performance and effect cost reduction.

In the future, as in the long past, this vital industry can continue to count on B & W's research and resourceful engineering to continue searching for better ways to help make paper products.



PRESSURE VESSELS—Dependable welded construction, in sizes and shapes for any paper mill requirement, can be fabricated by B&W from carbon, alloy, or clad steels. All vessels are x-ray inspected and stress relieved. Shown above is one of several 38½-ton, 30-ft. x 10¼-ft. I.D. wood pulp digesters made of Croloy-Clad Plate for a western mill.



TUBES—Seamless and Welded Tubes are made by B&W in the widest range of carbon, alloy, and stainless steel analyses available from one source. Whatever kind is needed to withstand corrosion, oxidation, contamination, creep, temperature, or pressure in paper mills—B&W makes it.

P-26 T

FOR PAPER MILLS—B&W-Tomlinson Recovery Units . . . B&W, Integral-Furnace, Stirling, Type H Stirling and Cross-Drum Boilers . . . Boiler Components . . . Pulverizers . . . Fuel Burning Equipment . . . Seamless & Welded Tubes for All Pressure and Mechanical Applications . . . Refractories . . . Process Equipment . . . Alloy Castings.

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
GENERAL OFFICES: 85 LIBERTY ST., NEW YORK 6, N.Y.
WORKS: ALLIANCE AND BARBERTON, O.; AUGUSTA, GA.

50th

Anniversary

1898–1948

We pause in this our Golden Anniversary Year to salute our many customers, employees, and sources of supply who have made this our first 50 years of service to the trade possible.

This half century of business has brought us no finer treasure than you, our friends.

★

Manufacturers of Crepe Paper, Fancy Gift Wrapping Papers, Waterproof Creped Kraft, Special Printed Tissues, Christmas Wrapping Papers, Table Covers, Paper Napkins, Special Printed Box Cover Papers, Dental Tray Covers, etc.

THE TUTTLE PRESS COMPANY

APPLETON • WISCONSIN

★

BARNEY BENSON — BOB WILLIAMS

HOWARD GERBER — PAUL FOSTER

PETER TALBOT, Jr.

WILLIAMS-GRAY CO.

221 North LaSalle Street

Chicago — Illinois

★

Lindsay & Niagara Wires

Knox "Excelsior" Felts

Siamese & Richland Dryer Felts

Splicing Tissues

Deckle Webbing

Carrier Rope

Etc.

★

PHILADELPHIA FELTS

Robert M. Guie — William G. Putney

Robert J. Brennan

T. Lawrence Johnson — South

Charles M. Server — Pacific Coast

PHILADELPHIA FELT COMPANY

Philadelphia 24, Pa.

TILESTON & HOLLINGSWORTH Co.

•

Papermakers

FOR MORE THAN 145 YEARS

•

Papers of Old-Fashioned Quality.

•

213 Congress St. — Boston 7, Mass.

FINLAND

DELIVERS HER

WOOD PULP

MONTHLY

THROUGHOUT THE YEAR

(NO CLOSED NAVIGATION)

PULP SALES CORPORATION

230 Park Ave., New York 17, N. Y.

Telephone: MUrray Hill 5-8764

GAILLET & HARTIG CO., INC.
250 Park Avenue
NEW YORK 17, N. Y.

Cable Address: GAILLET
Telephone: PLaza 9-1250

WOOD PULP • PAPER
FELTS • WIRES
PULP & PAPERMAKING
EQUIPMENT

More than
HALF A CENTURY OF EXPERIENCE

For over 50 years The Beveridge Paper Company has been known for the excellence of its cardboards, bristols and cover papers. Beveridge specialties and special papers (embracing embossing, pasting and special converting) answer unusual paper requirements.

★ Also manufacturers of STEREOTYPE DRY MATS

THE BEVERIDGE PAPER COMPANY
Indianapolis 4, Indiana

CLEAN PAPER
is impossible with old, worn Screen Plates. Change to new, fine-cut "Fitchburg" Screen Plates and be amazed at the instant improvement in QUALITY.

"FITCHBURG" *New Type—Duplex Slot*
FLAT PLATES
Rolled Bronze and Copper
Plain or Chromium Plated
BIRD SCREEN PLATES
JONES SCREEN PLATES

FITCHBURG
Screen Plate Co., Inc.
301 South Street
Fitchburg
Massachusetts

Another Anniversary

CURTIS PAPER COMPANY
ESTABLISHED 1848
NEWARK DELAWARE

FOR 100 YEARS
MAKERS
OF
PAPERS FOR FINE PRINTING

pamphlets and broadsides, nearly 8,000 as the total number of imprints. Editions were not large in any instance, never, at the most, exceeding a few thousand copies, or of the pamphlets, probably only a few hundred.

In 1650, printed papers of the "all-over" pattern in various colors, and used in the binding of books, were in use in Germany and Italy. In 1661, the first New Testament was printed in America. It was John Eliot's translated into Algonquin printed at Cambridge, Massachusetts, by Samuel Green and Marmaduke Johnson. The Old Testament was issued in 1663, the two making the first Bible printed in this country. The paper was made in Europe.

In 1727, William Parks founded the Maryland Gazette, the first newspaper in Maryland, at Annapolis. Three years later, the first newspaper in South Carolina, the South Carolina Journal, was established by Eleazer Phillips, at Charleston. The first printing in Barbados, West Indies, a newspaper, the Barbados Gazette, was founded in Bridgetown by Samuel Keimer. Isaiah Thomas avers that this was the first American newspaper to be issued twice a week.

The Rhode Island Gazette, the first newspaper in that Colony, was founded in 1732 by James Franklin. William Parks established the first newspaper in Virginia, the Virginia Gazette, in 1735. Thomas Howe, at Basseterre, St. Christopher, West Indies, in 1741 published the first newspaper in the island, the St. Christopher Gazette. The earliest newspaper in Antiqua, West Indies, established by Thomas Smith, a former worker in the printing office of Benjamin Franklin, was founded in 1748. The newspaper was the Antigua Gazette, issued at St. John.

In 1751, the North Carolina Gazette, the original attempt at newspaper publishing in North Carolina, was established by James Davis, in Newburn. Connecticut's first newspaper, the Connecticut Gazette,

Old Wood Cut, Torn from a Page of the New York Sun of Nearly Eighty Years Ago—A Then Wonder Press, Printing A Great Daily Paper to the Amazement of the Multitude

THE AMERICAN INSTITUTE FAIR FOR 1869, AT THE EMPIRE RINK, NEAR CENTRAL PARK, NEW YORK—THE BULLOCK PRESS PRINTING THE NEW YORK WEEKLY SUN, DURING THE EXHIBITION.—SEE PAGE 115.

(Courtesy, Editorial Department, New York Sun)

(Courtesy, The Cincinnati Enquirer)

Like a Scene from "Front Page"

But, actually, a section of the editorial staff of the Cincinnati Enquirer, when that great blanket sheet became such a famous civic and political influence in the 1890's. Left to right: James Cox, later Governor of Ohio, and Democratic candidate for President of the United States, now owner of the Cox newspapers in Dayton, Ohio, and Miami, Florida; Walter Draper, now chairman of the board, Cincinnati Street Railway Company; Harry Shaffer, whose present address is unknown; James Allison, who later became the New York representative for the Cincinnati Times-Star, and was the author of a daily column, "New York, Day-by-Day." All four men were reporters on The Enquirer at the time the picture was taken.

was published at New Haven in 1755. Daniel Fowle, of Boston, founded New Hampshire's first newspaper, the New Hampshire Gazette, in 1756.

For the first time in European book printing "wove" paper was being used in 1757. John Baskerville of Birmingham, England, printed his *Virgil*, using the newly-conceived type of paper. Paper of this kind had been in use in China hundreds of years previous to its rediscovery in Europe.

The Townshend measures of 1767, placing import duties on paper, among other items, caused a shortage to exist in that item. Many makeshifts were resorted to in meeting difficulties that arose from this shortage of paper. Newspapers, particularly, were great sufferers, for they were the largest consumers, and evidence of the straits into which they were forced has been fully preserved in them. In some instances the regular weekly issues were omitted, because there was no paper. Frequently, they were printed upon paper of diverse sizes, colors and qualities, whatever the worried printer might be able to find.

Among other results of the necessity of economizing were some curious typographical vagaries. Printed matter was squeezed in on the margins, outside the usual width of the printed page, sometimes in narrower column width than in the body of the paper. Sheets of paper that had come from the mould, damaged or imperfect, or that may have been torn in the handling, were not thrown away. On the contrary, they were kept and carefully pasted, in order that they might still be used on the press. So skillfully was this repair work done that even now it is difficult to detect in copies of newspapers where such sheets were used.

It was during this same period of newsprint shortage that the many newspapers of the country, backed by worried government bodies, put out calls for rags. Campaigns, reminiscent of our paper drives during the recent World War II, took place in all the communities of the colonies.

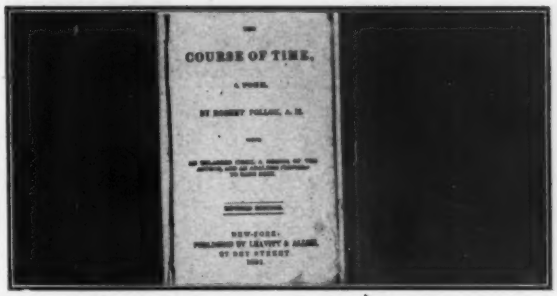
Although much of the paper was lacking in purity and regularity of color, which is more observable in the white or natural color paper than in the blue or brown, paper of the period was generally admirable, so far as texture and strength is concerned. Newspapers and books, printed in the middle of the 18th century and before, have endured, in well-nigh perfect condition, for more than 190 years, despite much handling and lack of care. At most, their pages have merely browned with age.

Isaac Collins, in 1777, established the first news-

paper in New Jersey, the Gazette. Four years later Judah Paddock Spooner founded the earliest newspaper in Vermont, the Vermont Gazette and Green Mountain Post-Boy, in Westminster. First Florida newspaper, the East Florida Gazette, St. Augustine, was founded by William C. Wells in 1783.

Robert Aitken, of Philadelphia, printed the first English language Bible in 1782. The volume embraces more than 1,400 unnumbered pages, the page size being 3½ by 6 inches.

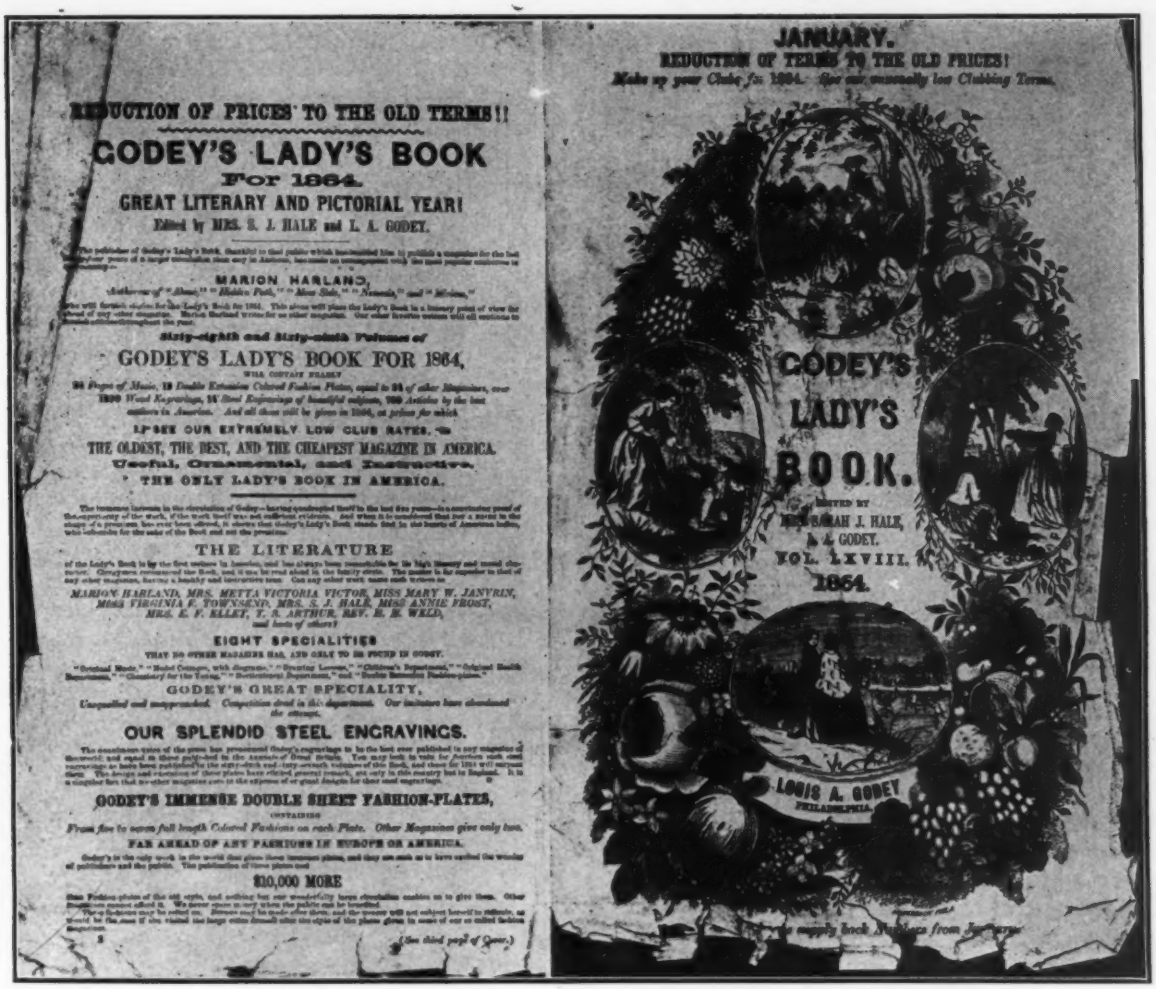
Maine's first newspaper, the Falmouth Gazette, was established by Benjamin Titcomb in 1785. Jacob Killen founded the first newspaper in Delaware, the Delaware Gazette, in the same year. John Bradford established the first newspaper in Kentucky, the Kentucky Gazette, at Lexington in 1788. A year later, Charles Fierer established the first newspaper in the District of Columbia, the Times and Potowmac Packet. West Virginia's first newspaper, the Potowmac Guardian and Berkely Advertiser, was founded in Shepherd's-Town by Nathaniel Willis in 1790. George Roulstone,



(From the John R. Thompson Collection)

"The Course of Time"—A Poem

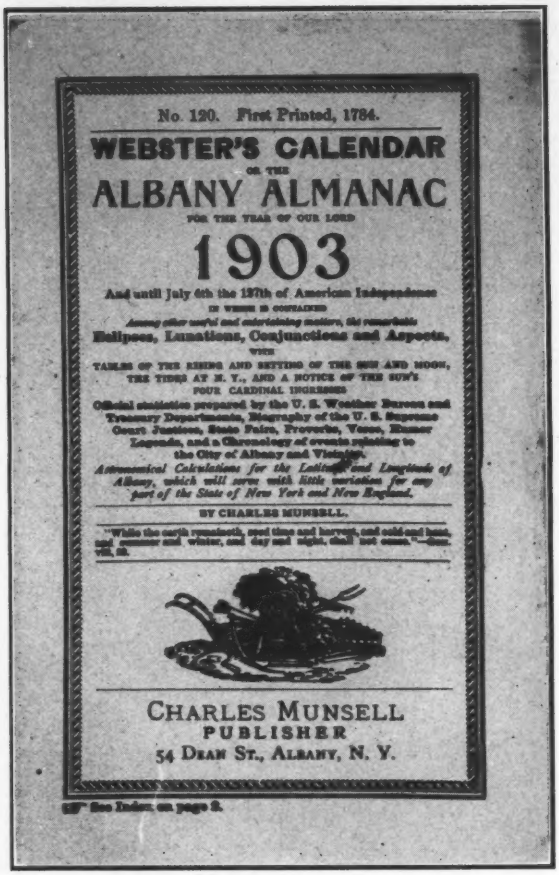
A much battered book of Robert Pollok, A.M., authorship, published by Leavitt & Allen, 27 Dey Street, New York, in 1853. It had been in Mr. Thompson's possession since 1857.


REDUCTION OF PRICES TO THE OLD TERMS!!
GODEY'S LADY'S BOOK
For 1864.
GREAT LITERARY AND PICTORIAL YEAR!
Edited by MRS. S. J. HALE and L. A. GODEY.
MARION HARLAND,
Sixty-eighth and Sixty-ninth Volumes of
GODEY'S LADY'S BOOK FOR 1864,
SEE OUR EXTREMELY LOW CLUB RATES.
THE OLDEST, THE BEST, AND THE CHEAPEST MAGAZINE IN AMERICA.
Useful, Ornamental, and Instructive.
THE ONLY LADY'S BOOK IN AMERICA.
THE LITERATURE
MARION HARLAND, MRS. METTA VICTORIA VICTOR, MISS MARY W. JANVRIN,
MISS VIRGINIA F. TOWNSEND, MRS. S. J. HALE, MISS ANNIE FROST,
MRS. E. F. ELLET, T. S. ARTHUR, REV. H. H. WELD,
EIGHT SPECIALITIES
GODEY'S GREAT SPECIALITY,
OUR SPLENDID STEEL ENGRAVINGS.
GODEY'S IMMENSE DOUBLE SHEET FASHION-PLATES,
FAR AHEAD OF ANY FASHIONS IN EUROPE OR AMERICA.
$10,000 MORE
JANUARY.
REDUCTION OF TERMS TO THE OLD PRICES!
GODEY'S
LADY'S
BOOK.
MRS. SARAH J. HALE,
L. A. GODEY.
VOL. LXVIII.
1864.
LOUIS A. GODEY
PHILADELPHIA.

(From the Louise M. Scott Collection)

Of Civil War Days—One of the First Women's Publications

This Philadelphia publication had double page colored prints, original in those days of the sixties, and now so highly valued by collectors for framing. They were of the wonderfully hoop-skirted women's fashions of th time, with tapioca hats, surcharged with flowered hot-houses.



No. 120. First Printed, 1784.

WEBSTER'S CALENDAR

OR THE

ALBANY ALMANAC

FOR THE YEAR OF OUR LORD

1903

And until July 4th the 127th of American Independence

IN WHICH IS CONTAINED

Among other useful and entertaining matters, the remarkable

Eclipses, Lunations, Conjunctions and Aspects,

WITH

TABLES OF THE RISING AND SETTING OF THE SUN AND MOON, THE TIDES AT N. Y., AND A NOTICE OF THE SUN'S FOUR CARDINAL INGRESSES

Official statistics prepared by the U. S. Weather Bureau and Treasury Departments, Biography of the U. S. Supreme Court Justices, State Pairs, Proverbs, Verses, Humor Legends, and a Chronology of events relating to the City of Albany and Vicinity.

Astronomical Calculations for the Latitude and Longitude of Albany, which will serve with little variation for any part of the State of New York and New England.

BY CHARLES MUNSELL.

"While the earth remaineth, seed time and harvest, and cold and heat, and summer and winter, and day and night, shall not cease."—Genesis VIII, 22.

CHARLES MUNSELL
PUBLISHER
54 Dean St., Albany, N. Y.

☞ See Index, on page 2.

Probably One of the Country's Oldest Almanacs, Published Continuously for About 140 Years

Established by the noted printing and publishing house of the Webster Brothers, State and Pearl Streets (under the ancient elm tree), Albany, New York. Here it was, too, that political essayist Tom Payne had his later pamphlets printed, when he fled to Albany from the British in Philadelphia. Webster's Almanac was a small publication, selling for five cents, containing local lore of the Hudson River and Catskill Mountain country of Washington Irving's "Rip Van Winkle" and its other legendary tales. Joel Munsell, author of "Chronology of the Origin and Progress of Paper and Paper-Making," printed and published the Almanac as successor of the Websters, and his son, Charles Munsell, a printer-publisher, took it up from there.

in 1791, established the Knoxville Gazette in Tennessee.

The Centinel, founded by William Maxwell in Cincinnati in 1793, was Ohio's first newspaper. It was followed in 1794 by the first newspaper in Louisiana, the Moniteur de la Louisiana, founded by L. Puclot, in New Orleans. In 1800, Benjamin Stokes founded the first newspaper in Mississippi, the Gazette, at Natchez. Elisha Stout founded the first newspaper in Indiana, the Indiana Gazette, at Vincennes in 1804.

During the later year, the American Company of Booksellers offered a gold medal for the greatest quantity and best quality of paper made from material, other than linen and cotton rags. Commencement bookbindings, originated in 1806.

Three more States, Michigan, Missouri and Alabama, received their first newspapers in the next few years. James Charles founded the Missouri Gazette in St. Louis in 1808; the Michigan was established in Detroit in 1809. It was the Michigan Essay; Samuel Miller founded the Mobile Sentinel in Alabama in 1811.

In 1810, Isaiah Thomas, in *The History of Printing in America,* estimated that the 195 paper mills in the country, at that time, manufactured annually 50,000 reams of paper, which was consumed in the publication of 22,500,000 newspaper copies. He calculated the paper manufactured and used for book printing at 70,000 reams annually, a considerable part of which was used for spelling and other small school books. In 1814, the number of paper mills in the United States was estimated to be 187, manufacturing about 340,000 reams of paper annually, the price averaging $2.50 per ream.

First book printed in America from stereotyped plates was finished in 1813. The London Times for November 29, 1814, was the first newspaper to be printed on a cylinder press with the aid of papier-mache matrices—stereotyping by the use of paper.

In 1817, the first paper machine was erected in America. It was a cylinder machine operated in the mill of Thomas Gilpin, near Philadelphia. The machine was based on the Dickinson principle.

First newspaper to make use of the Gilpin machine-made product was Poulson's Daily Advertiser, of Philadelphia. A year later, in England, to conserve paper, it was made a punishable offense to produce a newspaper exceeding 22 by 32 inches.

First important book, to be made on American machine-made paper manufactured on the Gilpin cylinder machine, was *A Complete Genealogical, Historical, Chronological, and Geographical Atlas,* by N. Lavoisne, published by Matthew Carey & Son, of Philadelphia, in 1821. Completion of Ree's *Cyclopedia,* Philadelphia, up to that time the largest work in the English language, was made in 1822. Printing of this 41-volume work, with 147 engravings, required 30,-

1765 Stamp Act on King George's Royal Paper Started Chain of Events Leading to American Revolution.

000 reams of paper. About 1825, when cloth bookbindings were first being used, a heavy coated paper, began to appear as end-papers in the larger books.

In 1828, the newspapers of New York State consumed annually 15,000 reams of paper, the price for which was from four to five dollars a ream. All the newspapers in the United States used about 104,000 reams, valued at half a million dollars. This, although not the only source of increased demand upon the mills, was, with book publishing, quite the largest, and, to meet it, many new mills came into existence, with machinery and other improvements. Expansion of individual plants, at increased cost, naturally followed. Where, before, it was possible to build and equip a fairly good mill for $10,000 or less, an investment would now represent at least double, triple or quadruple that amount, and even more.

During the same year, William Magaw, of Meadville, Pennsylvania, began making paper from straw.

SPECIAL FREE TRIP TO EUROPE
A CHANCE FOR A BRIGHT YOUNG MAN OR WOMAN HAVING 300 FRIENDS.
"The National Magazine."
SPECIAL OFFER FOR DECEMBER.
25c.
25c.
JOEL MITCHELL CHAPPLE, Editor and Publisher.
THE W. W. POTTER CO., 91 Bedford St., Boston, Mass.
WILL CARLETON'S MAGAZINE
"Every Where"
PERSONAL
E. H. BEACH, Publisher, 10 Baird Block, Detroit, Michigan.
EVERY WHERE PUBLISHING CO., Brooklyn, N. Y.
PAYS
The Readers We have— We hold!
THE GREATEST FAMILY NEWSPAPER IS
Leslie's Illustrated Weekly.
LESLIE'S WEEKLY
LESLIE'S WEEKLY, 110 Fifth Avenue, New York.

Group Advertising of Current Magazines of the Late Nineteenth and Early Twentieth Centuries

"Leslie's Weekly" was the illustrated "Life" of that time, plus articles on timely affairs of international magnitude. "National" and "Will Carleton's" were more or less favorites in the class of so-called "popular" publications of that day.

SCRIBNER'S for 1900
"FOR 1900, THE CLOSING YEAR OF THE CENTURY, HAS BEEN SECURED THE MOST VALUABLE PROGRAM THE MAGAZINE EVER OFFERED."
TOMMY AND GRIZEL, by J. M. Barrie, has finally been completed, and will be published in Scribner's Magazine, where "Sentimental Tommy" first appeared.
THE BOER WAR
OLIVER CROMWELL, by Theodore Roosevelt, will not be the history of a mere student, compiled with much research, but with little experience of affairs.
Theodore Roosevelt.
RICHARD HARDING DAVIS will continue to be a prominent and frequent contributor both of fiction and of special articles.
Henry Norman.
THE RUSSIA OF TODAY, by Henry Norman, author of "The Real Japan," "The Far East," etc., and the expert on foreign politics and colonial policies.
OMDURMAN AND THE SUDAN, by Capt. W. Elliott Cairnes, the well-known English military critic.
Richard Harding Davis.
A TRIP IN GREENLAND, and other articles, by Walter A. Wyckoff, author of "The Workers."
THE CHARM OF PARIS, by Ida M. Tarbell, illustrated by five famous foreign illustrators.
SENATOR HOAR: "Harvard Fifty Years Ago," and other papers.
THE BEST STORIES IN THE WORLD will continue to appear in Scribner's — stories by new writers as well as by Thomas Nelson Page, Richard Harding Davis, Henry van Dyke, Henry James, Edith Wharton, Ernest Seton-Thompson (author of "Wild Animals I have known,") and many others.
ART FEATURES include, beside the uncommon illustrations for "Cromwell" and the other pictorial plans mentioned, special articles on art and artists, such as "Puvis de Chavannes," by John La Farge, to be illustrated, in color, from the great artist's work; special illustrative schemes by Walter Appleton Clark, Henry McCarter, E. C. Peixotto, Dwight L. Elmendorf, and others. Also color-printing and colored covers.
$3.00 a Year. 25 cents a Number. CHARLES SCRIBNER'S SONS, New York.

Century Old Magazine and Book Publishing House of Charles Scribner & Sons (Established in 1840), New York Advertised Scribner's Magazine in 1900

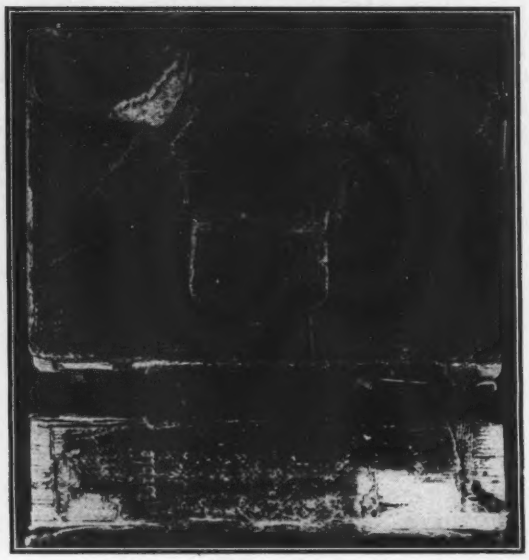
It will be noted that even Theodore Roosevelt, perpetual politician and President of the United States (then Governor of New York) was writing on his favorite Oliver Cromwell, for whom he readily admitted he had patterned his life.

It is said that an edition of the New Testament was printed on this cheap yellow paper that sold for five cents. In the same year straw paper was also made in Chambersburg, 300 reams daily, selling for less than $2 a ream for imperial size (22½ by 29 inches).

In 1829, Braille published in Paris his system of writing for the blind, the development of this method depending upon the use of a paper light in weight, yet capable of being embossed. During 1930, book titles were printed on paper and pasted on the backs of books.

An issue of the Crawford Messenger, Meadville. Pennsylvania, is said to have been printed in 1830 on paper made from lime and aspen wood. The paper used to print the edition of October 28, 1830, appears different from all other issues. But, inasmuch the paper has not been analyzed, it is not possible to state definitely that it is woodpulp paper. It has not been possible to procure a sample of the paper for examination.

By 1856, the consumption of paper in the United



(From the John R. Thompson Collection)

Holy Bible with Wrap-Around Leather Clasp

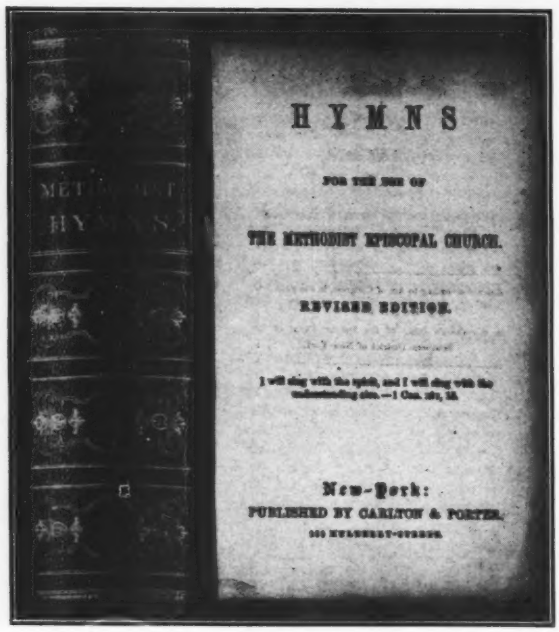
Printed in London, England, by G. E. Eyre and W. Spottiswoode at 189 Fleet Street in 1853, and presented to the owner, John R. Thompson, in 1854, when he was 9 years of age. It is in a worn and much dilapidated condition.

States had reached a point where it equalled that of England and France combined. Newspapers of New York City required 12,000 tons of paper for the year, and, by 1864, newsprint had reached the price of 28 cents a pound.

July 4, 1859, the world's largest newspaper was published in New York by George Roberts. The sheet measured 70 by 100 inches, with 13 columns to the page. The paper was said to have cost the publisher $60 per ream, each ream weighing 300 pounds. It was intended to print 28,000 copies, but the press broke down before the job was completed. Only one issue of this paper is recorded.

During the same year the first printed sheets of an American book, to be folded mechanically, was a thick quarto volume concerning the *Rosetta Stone,* published in Philadelphia. The folding equipment was devised by Cyrus Chambers, of that city.

Census of 1860 showed that New York City alone used $5,000,000 worth of paper and ink, producing $11,000,000 in books, newspapers, etc., employing more capital than any other single industry.



(From the John R. Thompson Collection)

Beautifully Bound Miniature of Methodist Hymns of the Year 1849

The Youth's Companion Free Every Week to 1900.
CAPT. CHARLES D. SIGSBEE.
More than 200 distinguished contributors, Soldiers, Sailors, Statesmen, Scholars, Travellers and Story-Writers, will help to enrich the volume for 1900. Among them are:
Gen. Wesley Merritt.
Elizabeth Stuart Phelps.
Rider Haggard.
Rebecca Harding Davis.
John Philip Sousa.
Jesse Lynch Williams.
Ian Maclaren.
Octave Thanet.
Margaret Deland.
Gen. Charles King.
Capt. Chas. D. Sigsbee.
Andrew Carnegie.
The Annual Announcement Number, containing full Illustrated Prospectus of the volume for 1900, sent free, upon receipt of a postal card, to any address.
Subscribe Now
sending $1.75, the price of a year's subscription, with this slip or the name of this magazine, and we will send
The Companion Calendar Free,
the most beautiful souvenir ever presented by the publishers, and all the remaining issues of THE COMPANION for 1899, in addition to the 52 weeks of the 1900 volume—a library in itself.
THE YOUTH'S COMPANION,
201 Columbus Ave. BOSTON, MASS.
ANDREW CARNEGIE.

Another Famed Boston Magazine—The Youth's Companion of 1900

It contained all the mildly exciting adventure and success stories of the then modern age of youth. Its writers were in tune with the times—dollar diplomacy days—when heroes of the successful, tho small, Spanish-American War were men who had "Remembered the Maine," like Captain Charles D. Sigsbee. Also the money-king, Andrew Carnegie, and those prolific authors of adventure and intrigue, Davis and Rider Haggard, with the dramatic army and Indian story recordings of General Charles King.

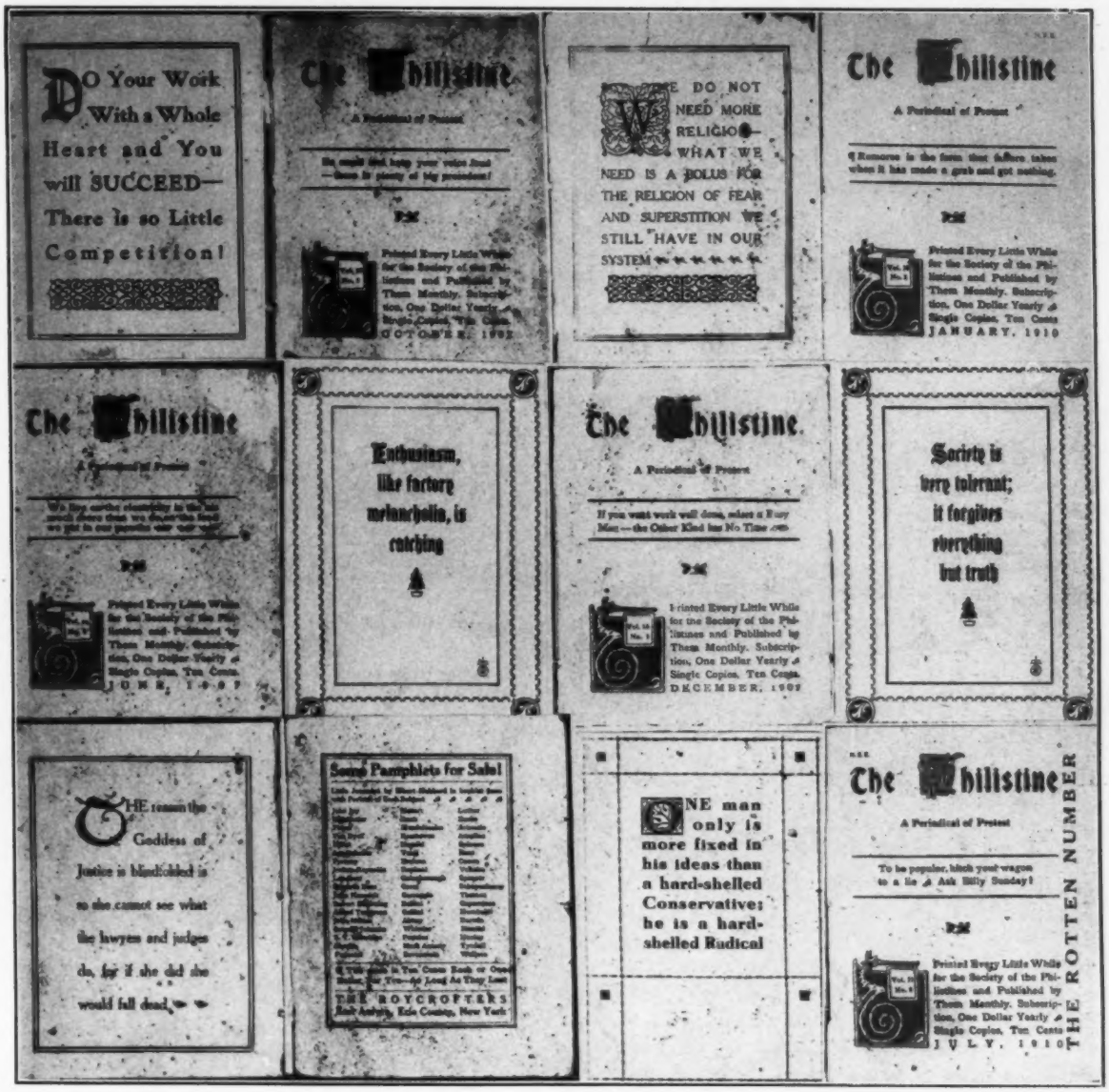
The Boston Weekly Journal for January 14, 1865, was printed on paper made from wood pulp. The Daily Journal of the same date appears to be on paper of the regulation sort. It is stated editorially that the entire edition of the Journal for January 15 was printed on "paper made of wood, a new process." The New Yorker Staats-Zeitung, in its editions of January 7, 8, and 9, 1868, was printed on American newsprint, made from ground-wood pulp, the first New York City newspaper to use paper made of this material.

At first, the prejudice against paper with wood content was very pronounced, and it was considered to be "shoddy" and inferior stock by the newspaper owners, but it gradually worked its way into newspaper pressrooms. The wood pulp paper lowered the price of newsprint at a time when circulations were mounting, and newspapers were increasing in the number of pages which they contained.

First instance in the United States of coating paper on both sides was accomplished by Charles Gage, of

The Famous "Philistine" and Its Equally Famous Mottoes

This first pocket sized publication (probably the original of the Reader's Digest size) was printed by Elbert Hubbard, of East Aurora (near Buffalo), New York. Hubbard was famed for his caustic and perhaps egotistically cynical, tho good humored, quotations, in the "Philistine," his later "Roycroft" and the "Fra." They were monthlies of characteristic circulation, coupled to then original Hubbard printing and binding (books, too) of the later days of the nineteenth and early days of the twentieth century. Hubbard said he bound the first "Philistine" in strawboard (or butchers') paper, because he could afford aught else. And he foolishly contracted with a Chicago advertising agency for all space in the "Philistine" at an exorbitant 70% discount, not then realizing possibilites of the publication, which brought a fortune for the agency.


DO Your Work With a Whole Heart and You will SUCCEED— There is so Little Competition!
The Philistine
WE DO NOT NEED MORE RELIGION— WHAT WE NEED IS A DOSE FOR THE RELIGION OF FEAR AND SUPERSTITION WE STILL HAVE IN OUR SYSTEM
Enthusiasm, like factory melancholia, is catching
Society is very tolerant; it forgives everything but truth
THE ROYCROFTERS
ONE man only is more fixed in his ideas than a hard-shelled Conservative: he is a hard-shelled Radical
THE ROTTEN NUMBER

Magazines, Today, Are Right Up to the Minute

Springfield, Massachusetts, in 1875. This paper, to the extent of 100 reams, was made at the request of a New York bookprinter, Theodore DeVinne. It was to be used in printing a catalogue containing many colored wood engravings. William Waldon, of New Brunswick, New Jersey, had made the first coating of paper on one side in America in 1880. First half-tone,used in a New York newspaper, was perfected in the same year in America by Stephen Henry Horgan. Eventually, half-tone printing made necessary highly calendered and surface-coated papers. Three-color process printing, by use of half-tone plates, was invented by Kurtz and Ives in 1892.

With 22% of the machines idle, production of paper in the United States in 1899 was 2,167,593 tons. Full capacity could have been 2,782,200 tons. Forty-one years later, production had risen to 14,372,000 tons, with 14% of the machines idle. In their full capacity the machines would have produced 16,700,000 tons.

Returning to the year 1741, in the month of January, we find that the first two magazines of this country were then published. It is probably significant that the stormy and colorful career of the magazine in America began with a royal row, especially since both were published within three days of one another. One was published by Andrew Bradford, the other by Benjamin Franklin. Their appearance had been preceded by the usual newspaper announcements, and by a very unusual altercation.

Franklin claimed that the idea and plans of the magazine were stolen from him. Webbe, who had announced Bradford's magazine, readily admitted that Franklin had told him of his intended project, but averred that this did not restrain him from publishing one himself without Franklin's permission. Only three numbers of Bradford's magazine, the *American or a Monthly View,* appeared, and only six editions of Franklin's *General Magazine or Historical Chronicle.*

There were at least 45 magazines started between this time and the end of the century. In addition to those addressed to a more general audience, the group included a musical magazine, a German religious, a children's magazine, and a military one. Inasmuch as the sparsely settled new colonies could not bear the traffic, they came to very little.

Through the next few years there were several attempts to start magazines, with most editors swinging toward the need for variety. Special inducements, such as copper plates, were used to entice subscribers. Decidedly, the most ambitious periodical project yet undertaken in America was the inauguration of the *Columbian Magazine or Monthly Miscellany* by Matthew Carey and four others in September, 1786. The expense of printing alone was said to be about 100 pounds a month. Enjoying several years of profitable editions, it ceased publication at the end of 1792, because Congress did not amend the post office bill, so as to place monthly publications on the same footing with daily and weekly publications.

From the onset, the magazines had cast a disdainful calculating eye towards women interest articles, choosing, instead, to print the heaviest type material that could be found. *The Royal American* magazine, published in Boston in 1774, was a very grave magazine. It held to fact so closely that one number was delayed a week so that an account of weather conditions might be added.

The *Gentlemen and Lady's Town and Country,* appearing in 1784 for nine months, was the first magazine which openly catered to women. Having a rather brisk tone, its desire for a wider variety, than had been obtained before, was somewhat unhappily symbolized by its various styles of type. The magazine's wish was "to please, rather than wound, woman, the noblest work of God." This magazine's policy was definitely designed to pamper the ladies.

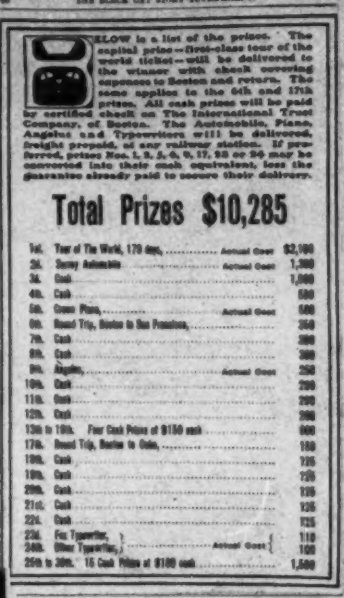
It wasn't until 1823, when Jared Sparks took over the helm of the *North American* magazine, that any magazine approached the title of being a national magazine. With the advent of Sparks came not only a far more substantial subscription list, but pay for writers. This was uniformly one dollar a page, with no copy thrown in. Sparks said every writer paid for his

---

(Picture, Opposite Page—)
"The Cat That Captured the Country"

This is the original 50-year past magazine, published by the Shortstory Publishing Company, Boston, Massachusetts, that printed five stories for five cents in the early days of the century. And it paid, not the "nothing" of the early American magazines, nor the $1 per page that was at last fixed as the standard rate of writer's compensation in colonial days, but the then fabulous sum of more than $1 per word. For it was not the length of a story that brought the cash, but its strength. Prize contests, then current, paid sizeable sums to almost amateur authors who were then just starting. For example, Jack London got his first check from this same "Black Cat." Nellie Littlehale Umbaestater, the famous artist signature of "U.L.N.", invariably drew the picturesque covers in color each month, always unique and different, while her father published the magazine.

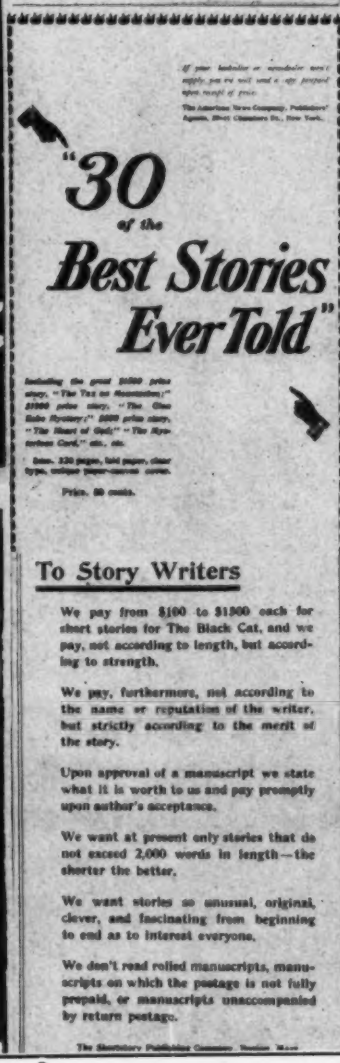
The Black Cat
5 CENTS
August 1898
A Russian Revenge.
Poule of Bethesda.
A Frosty Morning.
The Company Feed.
The Wisdom of Solomon.


BELOW is a list of the prizes. The capital prize—first-class tour of the world ticket—will be delivered to the winner with check covering expenses to Boston and return. The same applies to the 6th and 17th prizes. All cash prizes will be paid by certified check on The International Trust Company, of Boston. The Automobile, Piano, Angelus and Typewriters will be delivered, freight prepaid, at any railway station. If preferred, prizes Nos. 1, 2, 3, 4, 5, 6, 17, 25 or 50 may be converted into their cash equivalent, less the guarantee already paid to secure their delivery.
Total Prizes $10,285
1st. Tour of The World, 170 days, ... Actual Cost $2,100
2d. Stanley Automobile ..... Actual Cost 1,200
3d. Cash 1,000
4th. Cash 500
5th. Grand Piano, ... Actual Cost 400
6th. Round Trip, Boston to San Francisco, ... 250
7th. Cash 200
8th. Cash 200
9th. Angelus, ... Actual Cost 250
10th. Cash 200
11th. Cash 200
12th. Cash 200
13th to 16th. Four Cash Prizes of $150 each 600
17th. Round Trip, Boston to Cuba, ... 150
18th. Cash 125
19th. Cash 125
20th. Cash 125
21st. Cash 125
22d. Cash 125
23d. Fox Typewriter, } ..... Actual Cost { 110
24th. Other Typewriter, } 100
25th to 30th. 10 Cash Prizes of $100 each 1,000

The Black Cat
5 CENTS
March 1897.
The Stolen Melody
The Bramble Gift Trust
The Parchment Slave
Monsieur Angot
The Ivory Bells

The Black Cat
February 1902
5—Complete Stories—5

The Black Cat
A Postal Card Tragedy.
The Gentleness of Mrs. Hatch.
Effy's Automatic Housemaid.
The Curse of Zotom Rehoyn.
To Save a Stainless Name.
5 CENTS
THE SHORTSTORY PUBLISHING CO 144 HIGH ST BOSTON, MASS


If your bookseller or newsdealer won't supply you we will send a set postpaid upon receipt of price.
The American News Company, Publishers' Agents, Short Chambers St., New York.
"30 of the Best Stories Ever Told"
Including the great $5000 prize story, "The Yes or Nomination;" $1000 prize story, "The Clue Rube Mystery;" $500 prize story, "The Heart of Gold;" "The Eyewitness Card," etc., etc.
Size, 320 pages, laid paper, clear type, unique paper-covered cover.
Price, 50 cents.
To Story Writers
We pay from $100 to $1500 each for short stories for The Black Cat, and we pay, not according to length, but according to strength.
We pay, furthermore, not according to the name or reputation of the writer, but strictly according to the merit of the story.
Upon approval of a manuscript we state what it is worth to us and pay promptly upon author's acceptance.
We want at present only stories that do not exceed 2,000 words in length—the shorter the better.
We want stories so unusual, original, clever, and fascinating from beginning to end as to interest everyone.
We don't read rolled manuscripts, manuscripts on which the postage is not fully prepaid, or manuscripts unaccompanied by return postage.
The Shortstory Publishing Company, Boston, Mass.

The Black Cat
April 1901

"At Tank No. II"

The Black Cat
MAY 1900
The Yarnstads.
Anna McClure Shaff.
David and Goliath.
Ellis Meredith.
One Chance in a Million.
Harold Kingsbury.
A Deserter.
Algernon Tassin.
At Tank Number Eleven.
Frank Lillie Pollock.
5 CENTS

book like any other subscriber. To sell oneself in print was considered compensation enough.

And so it went through the next 120 years, with a new generation of editors and publishers arising every quarter century, injecting new ideas, bringing forth new Elbert Hubbards, McClures, Munseys and Curtis's. To show the importance of the magazine in the literary world one may study the words of a book publisher who refused to make the books of an American writer unless they had been first published and acquired recognition through the columns of magazines. It was his contention that American authorship would be at a low ebb if it were not for the great American magazines, with their international reputation and circulation.

Similarly progressive to the American magazine publisher is the Canadian periodical publisher. A study, stressing the future paper requirements of Canadian periodicals, disclosed in 1947 that 112 typical magazines and periodicals plan a 77% increase in paper consumption over the next five years. It was estimated that per capita consumption in Canada, within five years, will increase to the current U. S. level.

According to the study, other developments, pointing to higher demand for book paper, are establishment of French editions of an American magazine, to be printed in Canada, which indicates a trend that is likely to spread to other U. S. publications, and possibilities for increased circulation outside the country.

Adequate supplies for Canadian periodicals, the study showed, will depend on adequate supplies of paper of quality comparable with that of U. S. publications, and availability of such paper at prices within their ability to pay.

Production of the first machine-coated paper ever produced in Canada, early in June, 1947, will do much to hasten that country's periodical growth.

But it is, indeed, to the United States that the marketing of paper looks for volume of business. Today, one publisher, perhaps, takes as much paper for a single issue as was used, years ago, for the entire year's publication of the then rather limited circulations of so-called "popular" newspapers and magazines. In fact, just now, a newspaper or magazine, that is in the running for honors of the A.B.C. (Audit Bureau of Circulations), numbers its readers by the millions, in actual count of circulation and in duplicated reading of the circulated family or group.

Life, Look, Saturday Evening Post, Collier's, Reader's Digest, Cosmopolitan, Ladies Home Journal, Woman's Home Companion, many more, have circulations that stagger the imagination in millions. Their total paper requirements are just as enormous as their figures in circulation. Several control or own their own mills, their own paper pulp reserves.

This may also be said for metropolitan newspapers, too, of the class of the New York Daily News, the Journal-American, the Times, the Herald-Tribune, the Sun, the World-Telegram. In other cities, also, as in Chicago, the Tribune, the Daily News, the Sun, the other papers of that great group, lay claim to circulations that are exceeded only by New York papers, in some instances. To cover the country, and to enumerate the newspapers having claim to circulations of 300,000 or more, would be to classify almost the entire roster of great city papers.

It has been said in this volume, over and over again, that the publications of this country require the largest quantity of paper. That is so not only in paper for publication printing, but also true of paper for other printing, circulars, letters, wrapping, shipping, and even for all department supply. Total requirements of the publications are far from limited to the demands of the presses. But, as each new subscriber is entered on the complicated listing of the average publication, and classified in all divisions, more and more paper is daily required to complete the circle, to keep account of the fact that the subscriber is a subscriber, and a potential customer of many of the advertisers of the publication.

In recently examining the records of circulation for just one periodical, the writer was impressed with the system, the voluminous card indexing, filing the accounts of record required. Every subscriber was entered by name, by business, by classifications broken down into character of the business, of the work done by the subscriber. Questionnaires were regularly mailed to each subscriber for this information, no matter what his address might be. And these addresses, in all parts of the world, were again classified by divisions and sub-divisions, according to marketing records.

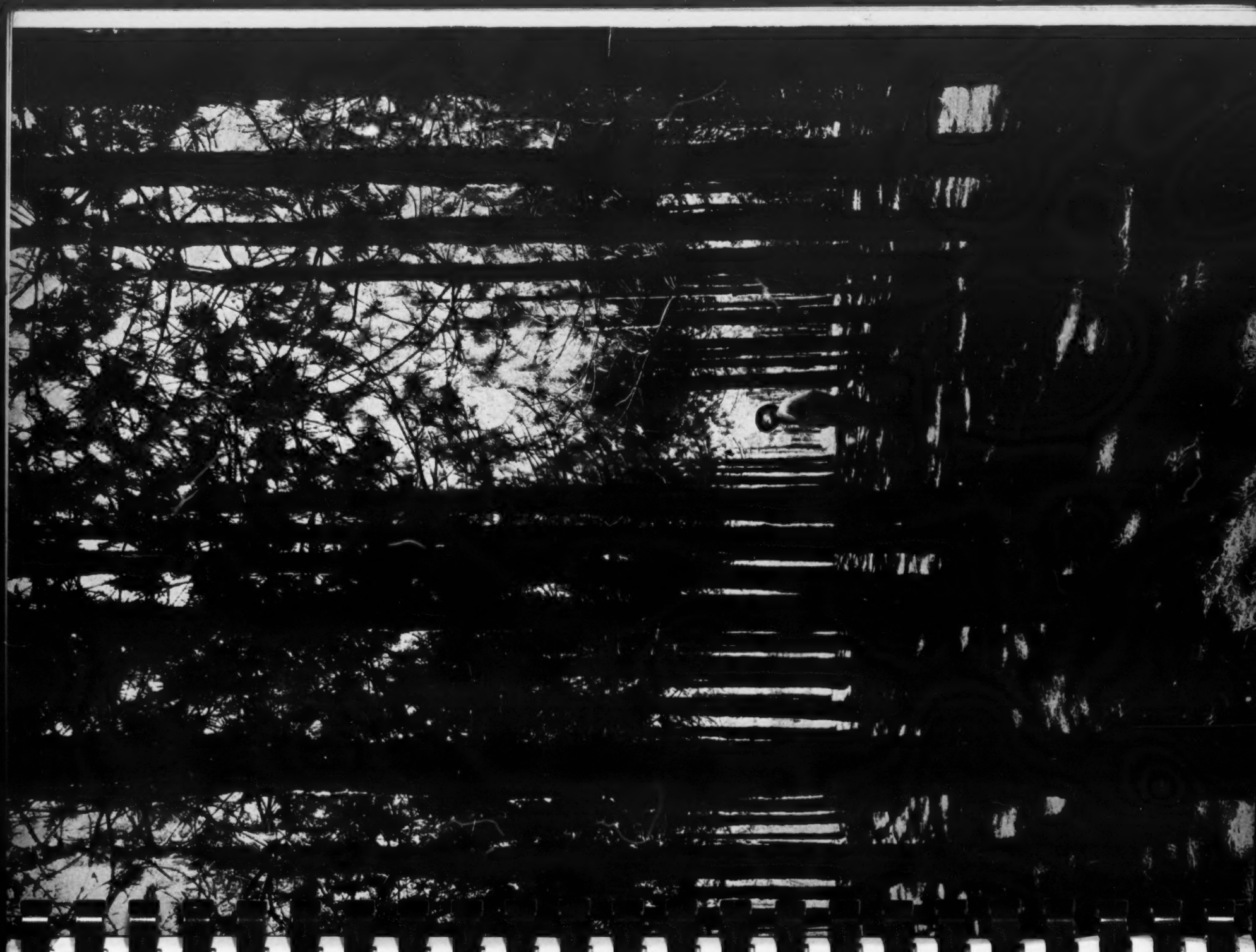
Advertisers desire and require this information, as a rule. They want to know, precisely, just what and which they are buying, are paying for with costly advertising dollars. Unless they know, exactly, they seldom spend their money in that publication. This is so because today, thousands of dollars are demanded on each contract. Where advertising pages formerly cost only a few dollars, or, at most, a few hundred dollars a page, years ago, today they are paid for in thousands of dollars per page. So, in a weekly publication, the amount multiplies by the week and by the month, as the contract develops. In a daily publication the page rate is not so large, but the frequency of the advertisement makes up for the total invested.

And it is an investment, indeed. No sane advertiser goes into a publication because he likes the advertising manager. He goes in with the intention, as a rule, of following up his initial advertisements with progressive insertions of a year, five years, ten years, or for as long as his business is active. Manufacturers' names and brands are not built in a day.

(Picture, Opposite Page—)
(Courtesy, Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin)

From Pulp to Publications

Pulpwood Forests of the Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin, Today, Starting From Scratch, 20 Years Ago



CHAPTER XXVII

Greeting Cards Gain in Favor Over the Long Years

THE greeting card, as we know it today, has been in use only a little over one hundred years. At least, that is the earliest date that recorded history can show any evidence of their origin. Various cards, through the years, have been called "The First Christmas Card," but, in 1936, a Christmas card was discovered by the British Museum in a recently acquired collection of prints and drawings that has dispelled all previous claims to originality.

The new discovery was a Christmas card etched in 1842 by William Maw Egley. It portrayed a decorative trellis, twined with grapes, framing separate panels in which were depicted many scenes of Christmas feasting, jollification and philanthropy. A Punch and Judy show was added, for good measure. In the center of the card, on a banner, was lettered the greeting, "Merry Christmas and Happy New Year to You." The word "To," with a space for the receiver's name, was at the top of the card, and the word "From" appears at the bottom, with a space for the sender's name.

From the first dawn of civilization we know that man has been moved to use special forms of greetings to friends and relatives, both far and near, to commemorate important personal, national and religious occasions. They are important to every individual.

Even as papyrus was invented, it was linked with bright colors and messages, or valentines were drawn on it. Egyptians were artists and lovers of art, so it can be said that they considered the art of making their "greeting rolls" as a work of artistic merit. Egyptian papyrus greetings were carried and delivered by special messengers, employed for that specific purpose.

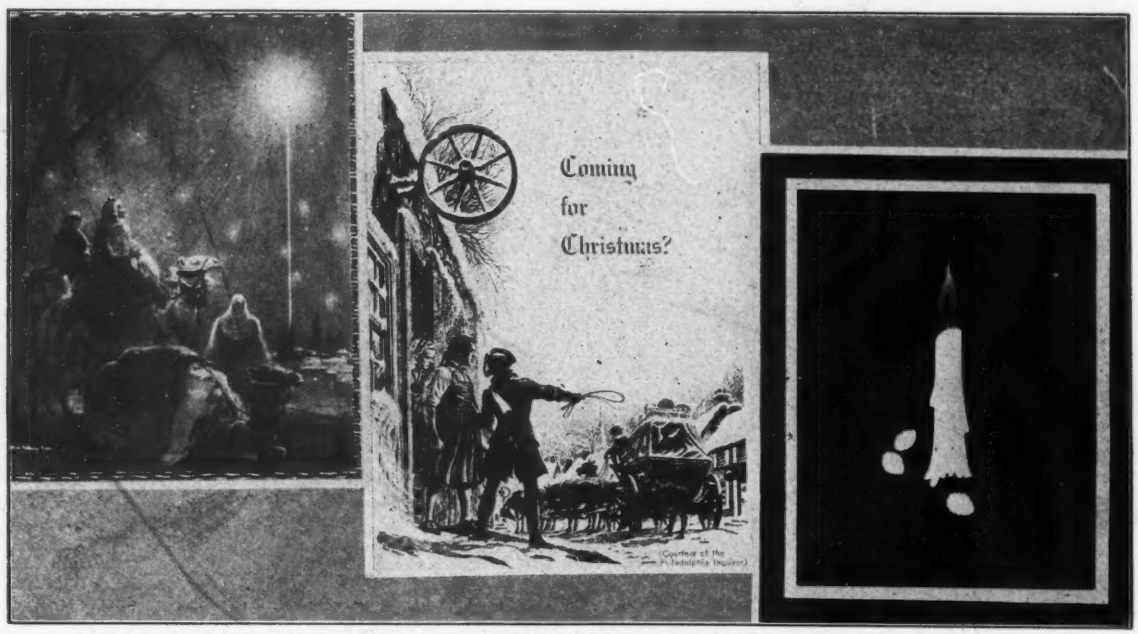
Learned Greeks and the Jews in the Holy Land were quick to follow the example of the Egyptians. With the birth of Christ came a new wave of friendliness and greeting. Paul, the Disciple, produced some of the greatest greetings ever known in his letters.

Through the dark ages much of the literature and culture, which had arisen, was stifled. But it is considered certain that letters and messages of good cheer were exchanged, all over the continent of Europe. Chivalry reached its pinnacle, and frequently scribbled notes of endearing affection were thrown over beleaguered walls of cities and castles, to enter the window of some fair maiden.

Beginning of the greeting card thus came about. But, many common people lacked the knack of expressing their love and friendship, so the need for

Trio of Recent Christmas Cards

Left, Religious motif; Center, Personally designed card of a Philadelphia Inquirer reproduction; Right, Simple candle design.



(From the Norcross Collection)

A Card of 1790 for St. Valentine

a third party, to do their writing, must have been a necessity. Such copying was laborious and tediously made by hand. Many years were to elapse before mechanical means of reproduction would be available.

As stated before, the holiday greeting card was born in the middle of the 18th century. Ornamental note paper and envelopes appeared immediately prior to the first cards, with several publishers being credited with putting out excellent examples of the paper and cards. Many believe these to have been the forerunner of the Christmas card, despite the fact they bore no sentiment or mottoes.

The holiday feeling may be credited to the Prince Consort, who has been linked with the idea of using Christmas trees in the late 1820's, and to Charles Dickens, whose writings did much to popularize the Yule season, and greatly increase the genuine Christmas feeling.

An English journal, published prior to 1846, gave credit to a Thomas Shorrock, of Leith, as being the true inventor of the Christmas card. He was said to have issued a card several years before, on which appeared the picfure of a laughing face with the motto: "A Gude New Year to Ye." A workman, named Daniel Aikman, also was said to have engraved a copper plate about 1840, which was later published bearing a Scotch motto.

Inasmuch as a copy of this card was never found, credit was given—until the Egley etching was found by the British Museum—to Sir Henry Cole for suggesting in 1846 to J. C. Horsley that he design a special greeting form to send to his friends at Christmas.

Acting on the suggestion, Horsley produced a drawing with a decorative trellis. On this is entwined a grapevine forming small panels at the left and right in which he showed figures representing two acts of charity, "clothing the naked" and "feeding the hungry." A picture of merry family party, all holding wineglasses filled to the brim, is contained in the center panel. The words "A Merry Christmas and a Happy New Year To You" are included underneath the picture. A place was left at the right for the sender's signature. The word "To" with space to fill in the name, was left above the design.

One thousand copies were lithographed and printed by Jobbins, of Warwick Court, Holborn. The cards were colored by hand. Messrs. De La Rue reproduced it in 1881 in the chrom-lithographic process, and many copies were sold.

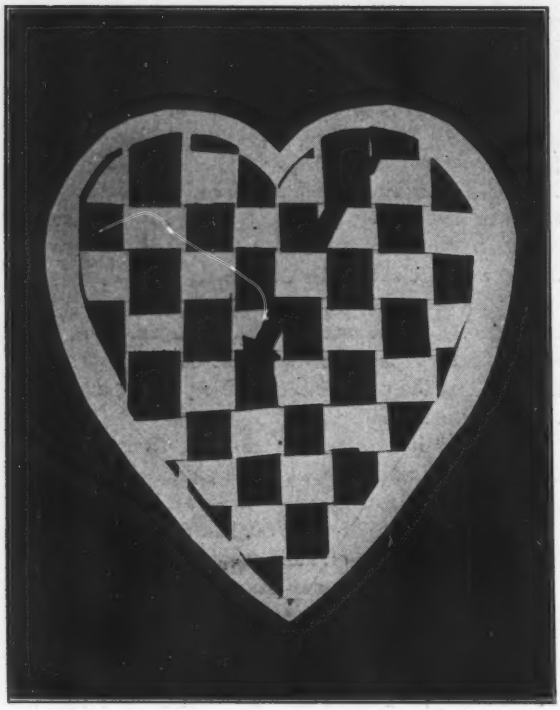
The early history of the English Christmas card, its design and publishers, may be gained from a study of the hobby of collecting greeting cards. Many publishers, in existence about 1880, had more or less complete sets of samples on hand.

Gleason White, writer of an article entitled "Christmas Cards and their Designers," published in a special edition of "The Studio" (England) in 1894, said that Jonathan King was the best authority then known on the subject. White said King's collection of cards was "contained in some 700 volumes, weighing, collectively, between six and seven tons, includes about 163,000 varieties, and although not exhaustive, offers what is practically a completely illustrated history of the many years between 1862 and today (1894)."

White said that he personally, in the preparation of his article, had looked over publisher's collections totalling over 200,000 different designs. Rapid development of the Christmas card business, during the first quarter century of its existence, is readily seen. At first, like many great inventions, the Christmas

(From the Norcross Collection)

Bartolozzi Designed This Valentine Card in 1798



Hand Made Valentine Card of A 9-Year Old Boy

card was ridiculed, but, soon all parts and classes of England adopted the custom. However, it wasn't until 1862, when Charles Goodall & Sons issued a series of cards, that they began to enjoy mass appeal.

Expensive drawings were first used as card models, and then sold to picture houses and magazines for another purpose. One such collection was sold for nearly $10,000 in 1884. Finest artists of the day were hired to draw the designs. One concern, in 1882, paid more than $35,000 to artists for a set of drawings.

In 1867, Marcus Ward & Company began the first truly commercial publication of Christmas cards. For many years this firm dominated the field in making better-quality card. No other English house was ever credited with doing the quality of work this firm did. At first, the firm imported "chromos" from Germany. These were mounted on cards, with decorative borders. Soon, however, Kate Greenaway was discovered by William H. Ward, a member of the firm. Thereafter, this artist's well known little gnomes, fairies and sprites were used on the cards. Other artists of note were added to the staff, giving the firm a solid reputation for quality.

Messrs. De La Rue entered the Christmas card field in 1875, and, until they discontinued in 1885, their work was distinguished by a high degree of excellence in mechanical reproduction. This firm, in addition to Marcus Ward & Company, kept away from the demand for the vulgar and novel, and discontinued issuance of cards, rather than surrender to the increasing demand.

Raphael Tuck & Company was another of the contemporary card publishers who strove for perfection, and who desired to keep Christmas card design at a high level. Members of the Royal Academy were retained by this firm to create special designs.

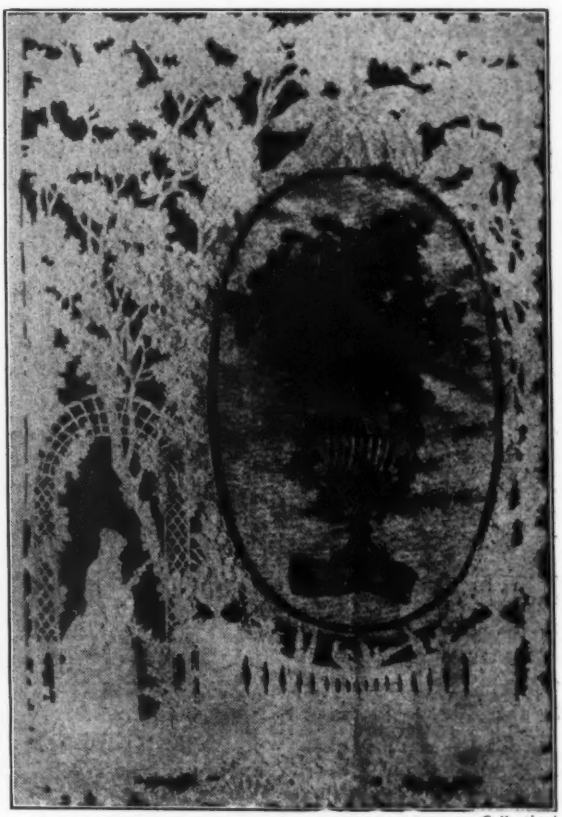
Hildesheimer & Faulkner, in 1884, published the first booklets, or folders, with inserts. From that period on, the general public began to ask for this type of card, as much as the single sheet variety.

Although the cards of the moment were essentially Christmas cards, they bore very little actual reference to the Yuletide season. Very little holly was used on them, and designs, apart from the Nativity, were employed. Some few pictured scenes of the manger, and others, of a religious nature, were employed, but mainly children, heads, birds, kittens, animals, and landscapes were used.

In the 1870's, frosted cards were made, and cards with silk fringes in the nineties. Padded cards, sachets, cutouts and other oddities also made their appearance.

To make the various styles, cardboard and the finest paper were used, as well as ordinary wrapping paper and all the other grades and types available.

With the advent of cards from Austria and Germany in 1890 in great quantities, and the appearance of Christmas cards in every conceivable outlet, the demand for them fell off. Publishers began to become more sluggish, and ceased creating new ideas, as with so many other things, people stopped buying the



(From the Norcross Collection)

1854 Valentine Card by Esther Howland, First American To Make Commercials

cards when they found them so plentiful and so cheap. Supply was greater than the demand.

First American greeting cards may be credited to an exile of the unsuccessful German Revolution of 1848—Louis Prang. His name stands out in a very favorable place in the greeting card industry, despite the fact the business was only a sideline of his affairs. On coming to America, Prang tried several ventures in Boston, but it was in 1856 that he founded a small lithographic business, which later employed the name of L. Prang & Company. Founding his plant in Roxbury, a suburb of Boston, he perfected in 1866 the lithographic process of multicolor printing. He called these prints "chromos." Sometimes his reproductions of oil paintings were so perfect that only an expert could tell the print from the painting. His reproductions far surpassed those of other graphic arts craftsmen, in both England and the United States.

Since he had a plant capable of such excellent work, he turned to Christmas cards in 1874 and shipped his first deluxe editions to England, where they found a ready sale in competition with English publications. He placed them on the American market in the following year, and continued making the cards until the cheap Austrian and German importations cut into his sales. Other work he was undertaking also was responsible for his giving up the greeting card business in 1890.

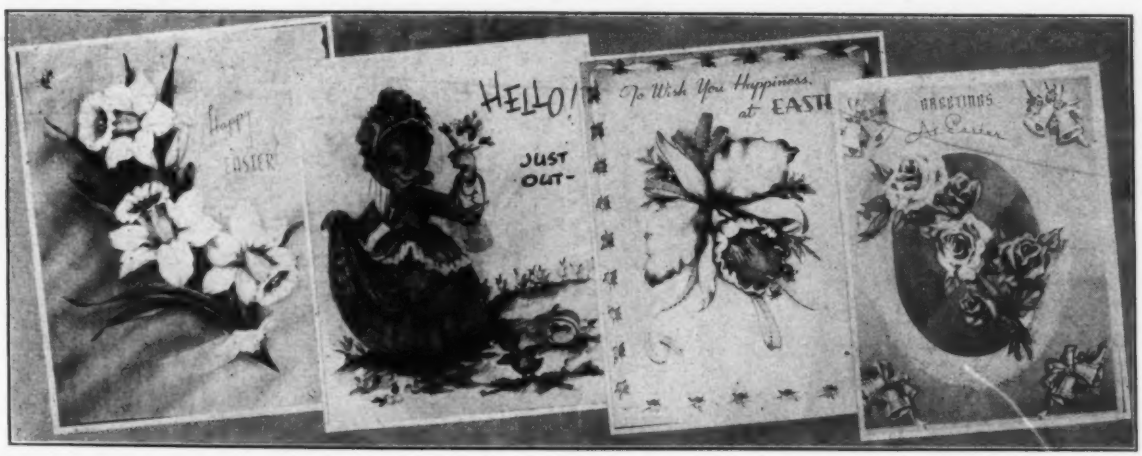
Although prices for American cards were usually higher than those of foreign design, the expense of making them in the Prang method, by which they were printed in not less than eight colors, and, sometimes, as many as 20 colors, to achieve very delicate effects, was considered greater. Containing a more strongly Christmas theme than any others, they were works of great craftsmanship.

In addition to the creation of birthday, Christmas and New Year's Day cards, Prang created some Easter cards. For these occasions he glued two pieces of cardboard together, and inserted a small piece of cotton batting, in which was placed a quantity of sachet powder. Inasmuch as they could be used long after the season of greeting was over, these cards were very popular.

Religious Mother's Day Card

In May of 1900, Alfred Bartlett opened an office on Cornhill, in Boston, and began publication of a monthly magazine of reprints, which he called "The Cornhill Booklet." Reprints of forgotten masterpieces and inspirational mottoes were printed in the booklets. Meeting such great popularity, Bartlett began to pub-

Easter Greeting Cards—Four of Recent Seasons



(From the Mrs. Thomas O'Connor Collection)

Looks Like Christmas, Tho, Doesn't It?

lish them separately under the name of "The Cornhill Dodgers." He sold about a million of these "Dodgers" during the ensuing ten years. Many were used as greeting cards and gifts. They were printed in two colors, sometimes on heavy beveled cardboard, and sometimes on deckle-edged imported stock. Introduction of the card with the true deckle edge, found on paper made by hand in the old European paper mills, met with slower progress, because the public merely glanced at the edges, refusing to purchase the cards. They considered the cards as frayed, mutilated or marred.

In the time between 1890 and 1906, there was a marked decline in creative and publishing activities in the greeting card field. Closing of the pioneering era, and the rebirth of the modern greeting card idea, was marked during that period. A number of the leading publishers of greeting cards of today began to appear in 1906, and the years which immediately followed.

There were many greeting cards in post card form during the early 1900's, but the fact that they were available in such great quantity, and at such low prices, tended to stimulate a demand for a more personal way of commemorating the important holidays and the various personal observations of the passing of time.

With the advent of real American Christmas cards in 1908, the competition of foreign cards was cut to the quick. Through these early years of the 20th century, a slow progress and apprenticeship evolved a great industry.

Greeting cards, prior to the first World War, were marked for their simplicity and dignity of appearance. Sentiment or message was the key figure, while the illustrated portion of the card was the less important factor in the cards' makeup.

In 1910, paper folders were greatly accepted in the less expensive styles. Small, single folders, of not more than 3 x 4 inches, were sold for 10c each. Simple designs, on deckle-edged Italian cards, could be retailed at 15 cents, and more elaborate ones, on folders, were sold at 25 cents. Larger single folders, on Strath-

Neat, Homelike Family Cards for Xmas Season

Combination Home-Made Greeting Card of Abram Le Gallez

more Japan paper, measuring approximately 6½ by 5 inches, were called "letters." It was necessary, however, to fold them once before placing them in the envelope.

From the onset, the American-made card has had a matched envelope, except in the case of parchments. In the early years of this century, this rule was always adhered to.

One artist, not satisfied with sending a single Christmas greeting, wrote a series of six "letters." These were to be opened in the morning, during the forenoon, at noon, in the afternoon, at six o'clock, and before retiring at night. In order that the time of opening could be read, each was sealed in a transparent envelope. The letter idea was a great success, and continued to lead high priced cards in sales for many years.

About 1915, boxes of assorted cards began to come into the scene. The box business has since become one of the greatest phases of the greeting card industry, but many publishers refuse to handle them, as they believe they sometimes cheapen the industry.

Historians are hard pressed to trace the real origin of St. Valentine's Day, but they have gone back as far as the pagan days of ancient Rome, where, in the Lupercalia, in honor of Pan and Juno, the custom of young men and maidens, drawing names from an urn to learn who their valentine was for the coming year, originated. Always occuring in the month of February, and, as the 14th of that month had been named in honor of several saints—at least five, and some declare seven—by the name of Valentine, it is considered that the drawings must have taken place on that day.

Naturally frowning on the pagan lottery custom, the Church attempted to quell it, but romance won out, and the lottery persisted. Since the custom of sending love messages was the natural end, the custom of sending valentines arose. Samuel Pepys, the renowned diarist, wrote in 1667 that certain valentine messages were being drawn and hand lettered. Thick sheets of gilt-edged letter paper were used. Envelopes were not yet in use, at that time.

Although the inventor of the lace paper valentine is unknown, the first published valentine of this nature came into being about 1850.

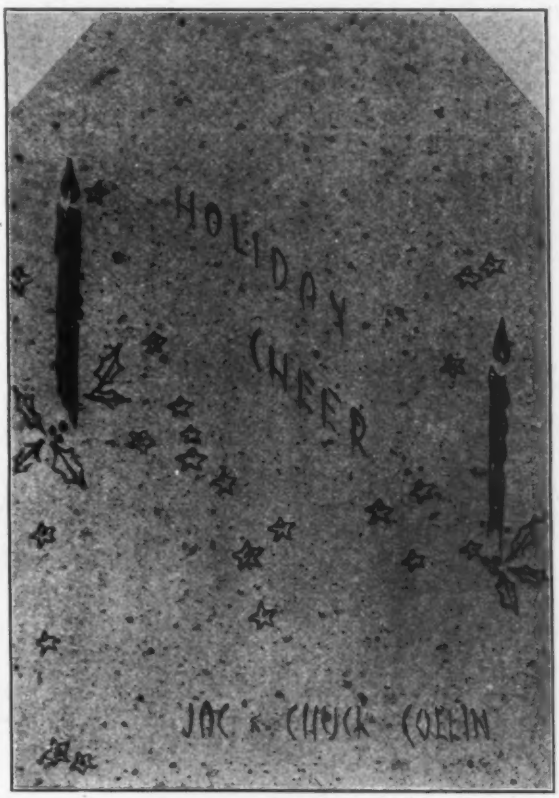
In the 1890's, great numbers of comic, penny valentines were sold in the United States. Printed cheaply, in several colors, they utilized cheaper grades of paper and newsprint. Enjoying a great popularity for many years, they have been printed in lesser and lesser quantities during recent years, as a result of disapproved on the part of greeting card manufacturers.

Louis Prang & Company, in Boston, also published valentines for several years, in addition to Christmas cards, with prices ranging from five cents to $3 each. No examples of lace paper work by this firm are available.

Although there has been a distinct yearning for the old-time lacy, embossed valentine, the greater part of valentine manufacture has been confined to either flat cards or beautiful folders, with designs on the covers and sentiments on the inside pages. Some few of the "old-timers" have been printed by blind embossing the borders around the card edges.

Long before the advent of the greeting card, comic or semicomic post cards were published for those who wanted to greet one another on St. Patrick's Day. About 1912, or 1913, the first greeting cards for St. Patrick's Day made their appearance, with the earlier types retaining the same style of the earlier comic varieties. M. T. Sheahan, of Boston, in 1911, published in card form, "The Irish Welcome," which was decorated with shamrocks. Sold throughout the year, this one was most appropriate for St. Patrick's Day.

Although all shades of green paper and card stock



(Designed by Mrs. Charles Collin)

Hand Made Holiday Card

are used in making St. Patrick's Day greeting cards, white also is used, particularly when green is printed or hand colored in the design.

About the same time that other new cards—such as Christmas varieties—were making their appearance on the American scene in 1908, Easter Cards were vogue. Much like their Christmas card contemporary, Easter cards did not, at first, bear strictly religious sentiments. Early ones usually bore the simple caption "Joyous Easter Greetings," or "Easter Greetings," printed in the corner of a floral card. One such card, published in 1910, carried a single yellow jonquil, with tall green leaves printed or embossed on a white, deckle-edged folder.

Mother's Day—first observed in Philadelphia on the second Sunday in May, 1908—was observed in the greeting card industry in 1912, although the issues were not marked "Mother's Day," since the sale was expected to be so small that, if they were not disposed of before Mother's Day, which was not yet widely-known, they could be sold at any time as general mother's greetings.

Father's Day met with cold reception—and the cards with just as cold a one. However, the greeting card, until recently, has served as the only token of remembrance of the day.

Fred Rust, of Kansas City, is considered the first to publish a specific card greeting the school graduate. Others followed this first one after 1910.

Friendship Day was the result of a movement started about 1919 in Kansas City. This is the first Sunday in August. Not in great acceptance, the day has been advocated by many Rotary clubs as a day for their members to observe.

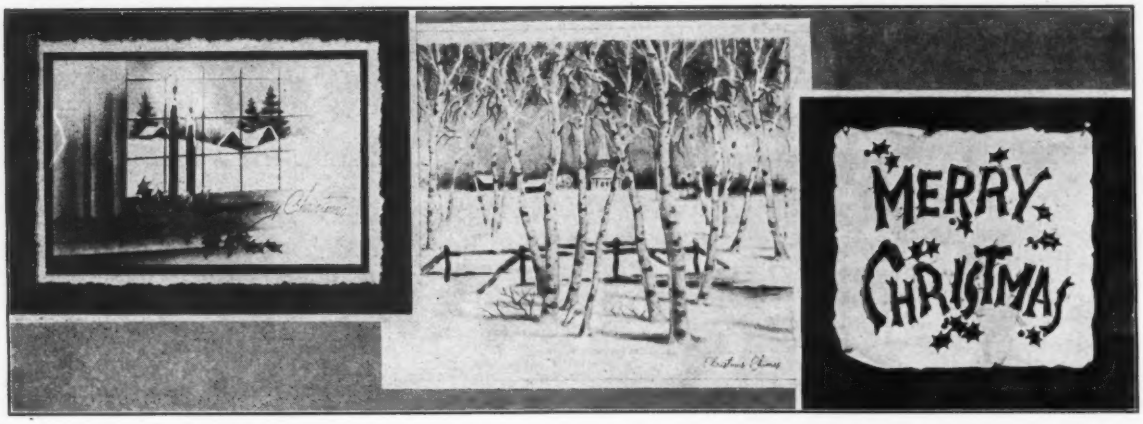
Thanksgiving Day cards of greeting were instituted in 1909 or 1910, but were not used to any great extent by the public until 1919. At that time the war was over, and people were more in a mood of thankfulness. This type of card has generally been made on buff, brown and old ivory shades of paper and cardboard. Most used designs include turkeys, fruit, vegetables, and scenes with golden-leaved trees.

Quartet of Miniature Holiday Cards

These small cards appear to be gaining in favor for Christmas Greetings all over the country this season, it appears.

Not long after the first Christmas cards came into being in England and the United States, birthday cards made their appearance. Some even claim birthday cards were invented before Christmas cards. Since early designs of Christmas cards were of a general nature, they were easily applied to birthday cards. Titles and sentiments were all that needed to be

Three Holiday Selections of Last Season



changed. Some simple greeting, such as "Birthday Greetings" or Happy Birthday," plus a four or eight-line sentiment, were adapted to cards by English publishers and by Louis Prang in America.

They were not pushed by merchants, and the small stock, of but a few designs, was kept in a drawer or box, far away from dust and dirt. Only rarely were samples displayed in windows.

About 1890, several folders and booklets were substituted for cards. Verses began to appear, but very few referred specifically to birthdays.

It wasn't until 1910 that the swing to new sentiments, with the word "birthday" actively mentioned in verse, came about. Many of these were in postcard form, and were of heavy card stock, usually with bevelled edges and of good quality. They had a ready sale at five cents each.

The birthday greeting card, or folder of that day—the folder was the popular form of greeting—was printed or engraved, in most cases, on paper instead of cardboard. Simple designs were used on most of them, with the publisher relying on the sentiments to sell the cards. He did, however, use good paper and matching envelopes, and tried to have the design, first capital letter and lettering, harmonize with the stock color.

One card, published in 1910, was a small double folder, which was printed in black on ordinary craft paper, with hand coloring. Another, bearing the date of 1911, was hand lettered on old ivory tinted handmade paper.

American cards of the better makes were usually linked with matching envelopes, using the same stock and color as the folder. Cards of all sizes, from 2½ x 4 inches on up to extra large ones, measuring nearly 6 x 8 or 9 inches, have come about. High priced cards have used lined envelopes.

At first, no publisher found much profit in the sale of wedding day congratulation cards. They originated about 1911, but were preceded by a few other cards of a congratulatory nature on other anniversaries, especially the wedding anniversary.

Cards for those shut in, or who needed a cheery message, were inspired by a "Sunshine Society" in western Massachusetts in 1911. Small folders, printed on ordinary white and buff paper, were issued at the suggestion of this society. They retailed at two to five cents each, thus allowing Sunday school teachers and other social workers to order them in quantities, at a low cost. Many novelties have been devised from the original design.

Fred Rust evolved the first "Bon Voyage" card in 1912. It enjoyed excellent sales until the S. S. Titanic disaster. One such card displayed on the cover a night scene with a large ocean liner, lighted from bow to stern, riding on the crest of a wave. The card sold in large volume, but not one of the cards sold following the ship's wreck. The picture was said to strongly resemble the ill-fated vessel. But, in 1919, the demand

Two Christmas-New Year Designs—One Religious, Other Topical

In the wide variety, there's always a choice.

increased, the war being over, and travel once again the vogue.

World War I automatically shut off all greeting card imports. Hence, it was that during the period from 1914 to 1930 that the greeting card business enjoyed an expansion, and a wider acceptance of its product than at any previous time. In the war years, unusual cards were used, such as one which enclosed a message

Two Ultra Conservative Cards

with enough tobacco for a cigarette; another, with several "soap leaves" inside; one, with an envelope containing "foot ease," and, another, with a stick of gum attached.

During the 1918 Christmas season, the "Hooverized Christmas Card" was the best seller. The folder, published by the Campbell Art Company, was printed in red ink on the cheapest kind of thin box board, gray in color, and tied with a piece of hemp string, instead of a ribbon. The card was supposed to symbolize the height of self denial.

In the years immediately following the First World War, dozens of new publishers entered the field, and healthy competition resulted in the introduction of many new printing processes, art techniques, decorative treatments, and a tremendous widening in the variety of titles available. Soon it became true that there was "A greeting for every occasion."

During this period the publication of greeting cards for birthdays, anniversaries and the conveying of messages of good cheer, to those who were ill, and many other cards, for everyday occasions, rapidly grew in popularity.

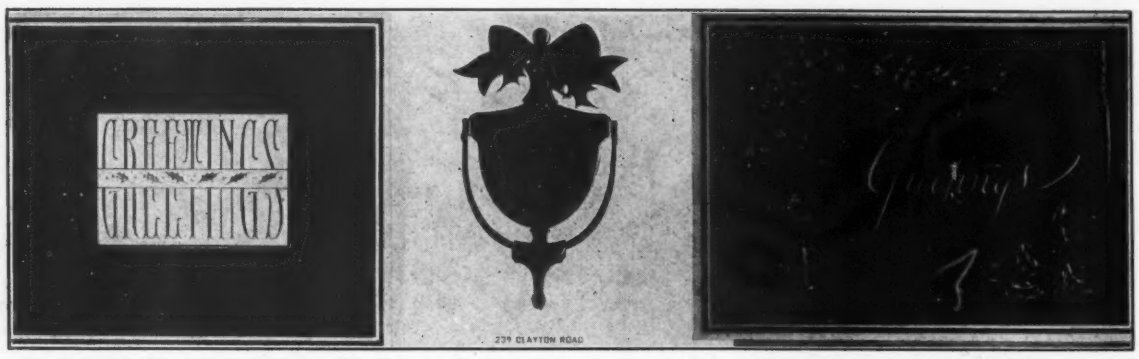
The greeting card industry in the United States by 1930 had become firmly established as a source of special communications of a sentimental and personal nature. The depression of the early thirties did little to retard the industry's growth. Of course, some recession was felt in the years between 1931 and 1934, but the greeting card business reached a new peak, in annual total sales in 1937, that far surpassed its previous peak of 1930.

One of the contributing factors to its steady growth in popularity was the fact that, about 1930, the greeting card publishers rediscovered the lithographic process. Most of the cards, during the immediate past, had been reproduced by steel die engraving, or letter press printing. But, in 1930, there was a definite trend toward multi-color half-tone reproductions. It was found that the lithographic process lent itself very well to the reproduction of colorful designs.

Such rapid strides were made in all phases of lithographic reproduction that, today, nearly 85% of all greeting cards are produced by the use of one or more lithographed colors. Until temporarily halted by the wartime restrictions of World War II, extensive research and study of all multi-color printing processes, by the various greeting card publishers, has resulted in many refinements of modern graphic arts, to make them more suitable for quality greeting card work.

Today, in the greeting card industry, there are about

Three Dignified Greeting Cards of a Personal Touch



100 greeting card publishers and manufacturers who create and produce their own lines, either within or without their own plants. In 1945, as an example, the estimated total sales of greeting cards at wholesale were $70,000,000, and the estimated total of individual units produced, in the same year, was three billion.

Publishers of greeting cards employ approximately 20,000 people, and they keep nearly 3,000 full-time salesmen busy presenting their lines to the wholesalers and retailers of the nation. In addition to all these representatives, more than 500,000 persons act as part-time representatives, selling greeting cards direct to the consumer in their homes and offices.

More than 65,000 retail outlets display and sell greeting cards, from the expansive displays in the large department and chain stores to the small cabinet units in the neighborhood drug stores.

Exchange of greeting cards contributes very heavily to the reveune of the U. S. Post Office. Nearly $100,000,000 yearly, it is estimated, is spent on postage to mail greeting cards for all occasions. This amounts to about ten percent of the total first class mail revenue of the Post Office Department.

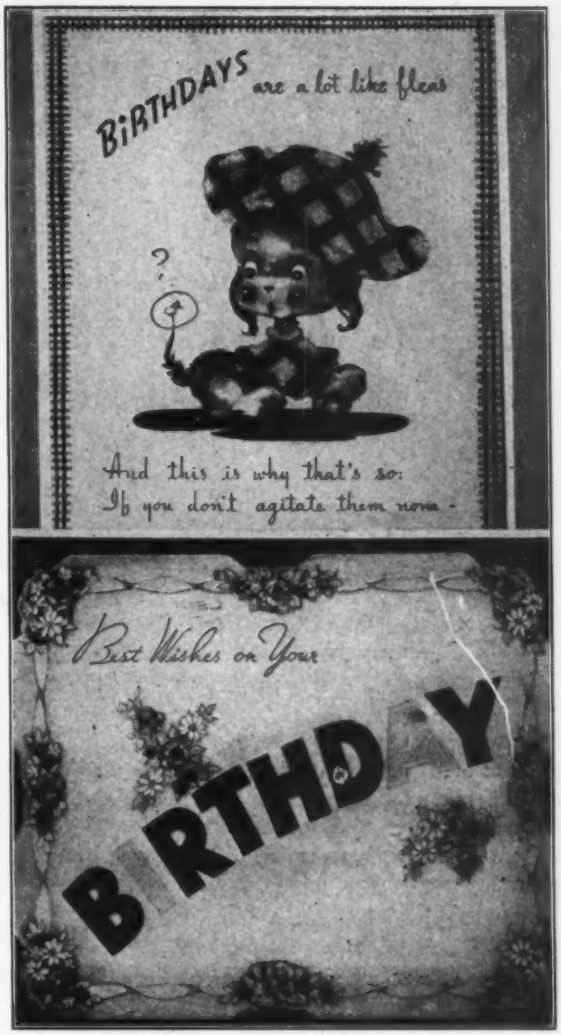
Greeting card publishers and manufacturers, who produce in excess of 85% of the annual output, carry on a number of constructive activities, tending to maintain and strengthen the greeting card business. This guiding group is banded under a national organization known as The Greeting Card Industry. Each year, at Christmas time, this group provides free Christmas cards for all patients in military and veterans hospitals throughout the United States. This is only one of the Association's altruistic services.

A number of difficult problems face greeting card manufacturers today. While paper restrictions have been limited, the fine papers needed for greeting card production are still in short supply. Paper is one of the largest factors that determines the success or failure of the various lines that are published.

Under continued emergency conditions, greeting card publishers have been happy to do what all other important users of paper are doing, and that is making the best possible use out of whatever papers are available. Of necessity, there has been a sharp decline in the variety and quality of the papers that would usually play an important part in building successful greeting cards.

Those who have been in the business for many years will recall that suppliers could furnish almost every variety of fine and fancy papers and cover stocks, and special imported handmade papers, just a few years ago.

Some of the fancier and extremely expensive stocks were discarded in favor of special runs of embossed offset papers, when increased usage of lithographic reproductions in publishing greeting cards came about. There was also a large increase in the use of mica coated and other fancy stocks suitable for offset and letterpress printing.

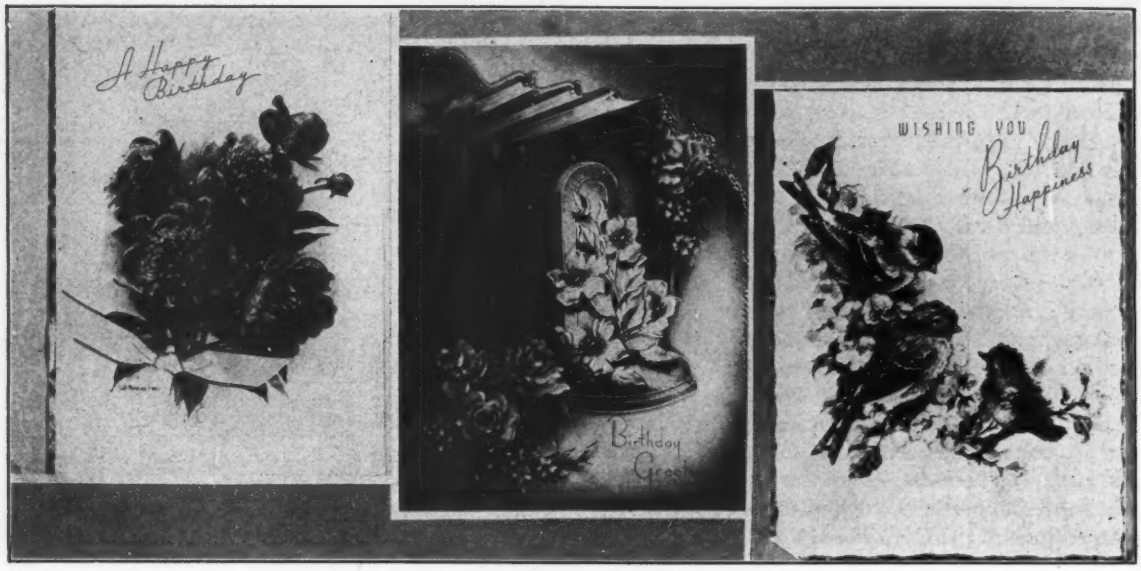


Birthday Cards of Vivid Color

Since the greeting card business is a very competitive one—and since success in publishing the cards depends almost entirely on the ingenuity of creators—paper makers and converters, who are alert to the possibilities of future progress in creating special papers, will, most of a necessity, receive benefit from their efforts.

Although it is true that much of the paper that is now produced for greeting cards is standardized, and must be sold within the limits of certain price ranges, great strides have been made in developing papers that have attained popularity as greeting card stock.

Through the cooperation of the paper maker and his representatives a tremendous volume of business has been gained from greeting card publishers in past years. The case of mica coated papers, that became so popular in the 1930's, is a good example. These attractive stocks, originally produced for fancy box wraps and other purposes, which were not related to greeting cards, were brought to the attention of a few leading greeting card publishers by paper salesmen.



Birthday Greeting Cards of Past Seasons

Styles change—so do the cards, it may be observed—as the years demand new (and plainer, simpler) art, more conservative versing.

First efforts to utilize the papers for reproducing multi-colored greeting card designs were not so successful, but many of the difficulties were eliminated through constant study of the problem, and through the efforts of the firms which had developed the mica papers.

Although the greeting card industry, as a whole, uses a very small part of the total amount of fine and book papers that are annually produced, individual manufacturers of these papers have found a good market, after a suitable stock has been submitted and accepted.

Paper and cardboard makers have contributed much to the success of the greeting card. Numberless fancy finishes, tints and colors have been evolved, so that all types of plates and methods might be successfully employed. Their chemists have striven to produce odd effects, to insure production of unique cards with a minimum of effort and expense. Working hand-in-hand with the greeting card publisher, the paper manufacturer will always have a steady market for his product as long as sentiment rules the world.

New cards, for the approaching season, are recovering from the extreme paper stock shortages of the war years. New card and paper stock, in striking color arrangements, is listed. Not only in the stock, but, also, in the processing of the printing. Every effort appears to be current to produce cards that will once again reinstate this country in its elaborate appeal to the masses—and also to the classes. For the extremes in "personal" cards are remarkable, in most examples, for their conservatism. Publishers have come to the point where they are guided, today, by accompanying designs of personal stationery, of individual tastes in quiet, rather than magnificent surroundings. Much of this slant toward the ultimate "best" has been brought about, too, by publications, especially women's magazines. They have printed specimens of the sort of greeting cards that appeal to the refined, to the finest in American demand.

Gone are the days, likely, of the flamboyant cards, when brash coloring, rather than tints and shades, occupied the market. Gone, too, are the days of the "cheap" stationery that constituted the enclosures. Envelopes must be in keeping with the cards. There is also a tendency to solicit more of the high class engraved cards of extremely personal design. Some of the finest stores are requiring close cooperation of the publishers in this endeavor, and the price is small consideration when quality, indeed, is asked.

There is greater opportunity, here, for the mills to make just what the trade demands. Paper is not as scarce as it was a few months ago, so the publishers are looking around for the best they can obtain. This applies to not merely the Christmas card, but to all the offerings at Easter, for Mother's Day, for the finest run of birthday and wedding cards. Announcements of births, marriages, anniversaries are, today, far away from the rather Gay-90 type of only a short generation ago. Then it was the novelty, the odd, the amusing card, perhaps, that held sway. Today, this is changed entirely to the plainest of reserved stock, of material that at once sets itself apart.

As long as this trend continues—and publishers don't know why it shouldn't—the greeting card is bound to increase in sales, and, as it gains, carry the paper trade with it.

Chapter XXVIII

Story of Paper Told At The Paper Museum

UNIQUE and comprehensive in hand-made papers from foreign countries, produced in early and later years of the industry, together with appliances for creating these papers, the Dard Hunter Paper Museum, at the Massachusetts Institute of Technology, Cambridge, Massachusetts, constitutes the result of travel and work of Dr. Dard Hunter for the last forty-three years. This collection of "Paperiana" is an outstanding one, of great interest and value from an historic standpoint, as well as that of the present day. The Museum at the Institute is the only one of hand-made paper, and appliances for producing it, in the entire world.

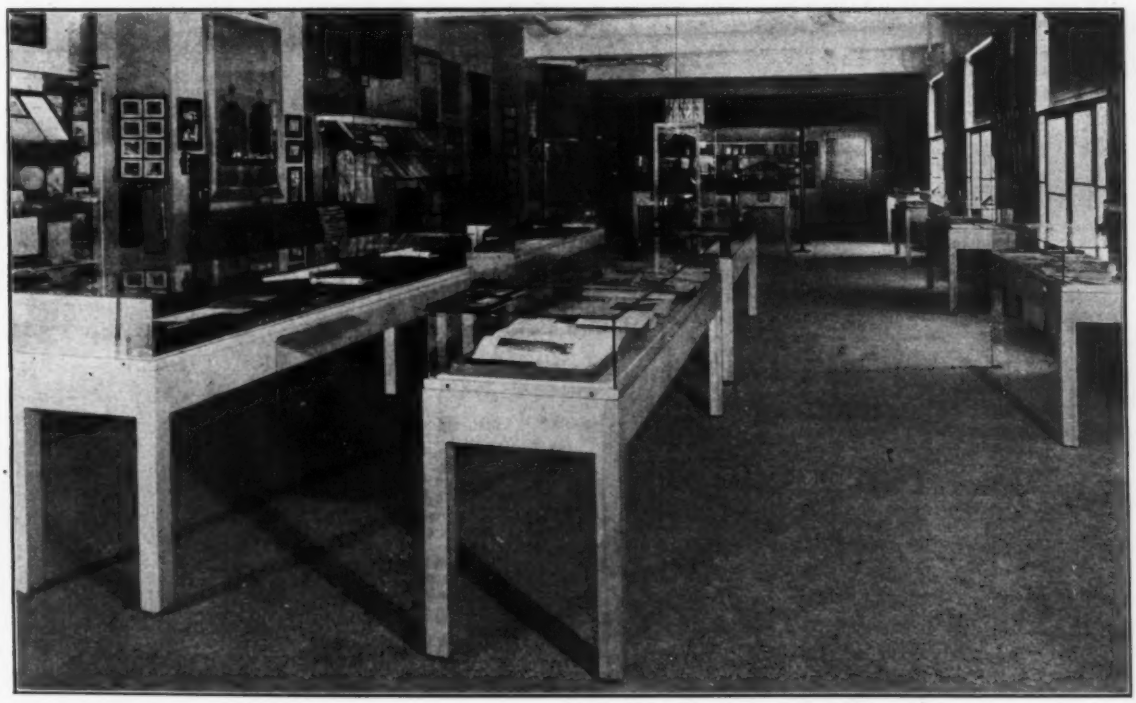
In modern times, papermaking and printing are two of the great industries of America, each dependent on the other, it is stated in an official description of the Museum by Dr. Hunter. As we have seen, paper had its origin in China about 105 A.D., the Chinese eunuch, Ts'ai Lun, making it from the bark of trees and fibers of plants. Earliest printing was executed in Japan in 770 A. D. or more than six hundred and fifty years after the invention of paper.

In the Occident, the first paper was made in Spain about the year 1144, while the earliest European printing appeared during the middle of the fifteenth century. It is seen, therefore, that, in the Orient, both paper and printing antedated these same crafts in the Occident by many hundreds of years.

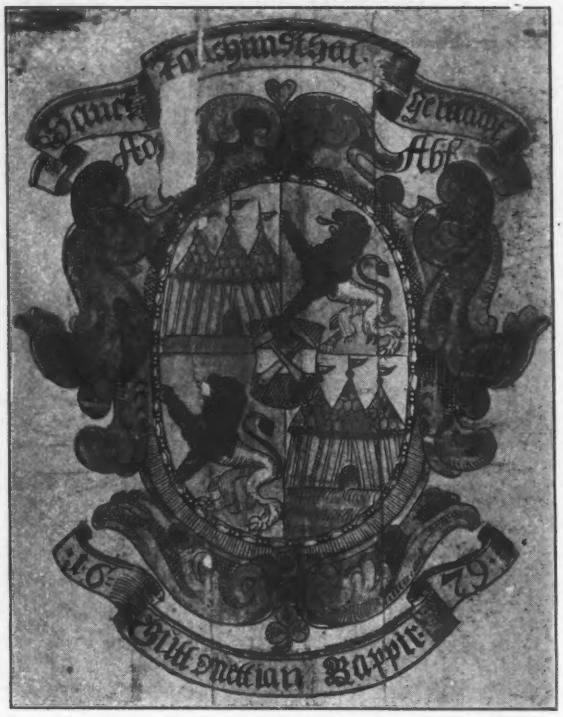
While printing, in both the Orient and the Occident, had its inception at a much later date than papermaking, the craft of printing, from an historical standpoint, has always received vastly more attention than the equally important and much older craft of papermaking. For centuries, countless bibliophiles have collected and assembled printed books and every item relating in any way to the subject of topography. There are museums devoted to bookmaking, bookbinding, type design, and the history of printing. Paper, however, has received but scant attention, and, even at the present time,

Paper History Is Graphically Here Told, Century by Century

A view of the Paper Museum, showing the exhibition cases containing papermaking equipment from all parts of the world. Walls of the Museum are decorated with numerous Chinese, Korean, and Japanese screen papers, with the original wood-blocks from which they were printed.



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Nineteenth Century Dutch Paper Label

A German ream label, such as used in the seventeenth century on packages of paper. This label is hand colored, and is dated 1679.

throughout the world, there are not above a half dozen serious collectors of "Paperina."

In 1912, Dard Hunter was a designer of printing in the Carlton Studios, London, England. While there, he visited the Science Museum. Here he saw, for the first time, two moulds for making handmade paper. Doing research work in the Museum, and in the Library of the British Museum, he was inspired with a deep interest in the early papermaking, the old watermarks and typefounding.

At the turn of the century, Dard Hunter started collecting material concerning paper, watermarks and kindred subjects. His first compilation, as the result of this collection, was a biography, issued in New York in 1916. Since that time more than a dozen books and pamphlets, relating to paper and papermaking, have been published, all the result of travel in far corners of the earth in search of tools, appliances and equipment employed by the makers of paper, both of the most primitive sorts and the most advanced types.

These journeys, in quest of material, have taken Dr. Hunter to almost every country of Europe; to China, Egypt, Morocco, Algeria, Sudan, Korea, Japan, Manchuria, Siam, Indo-China, Malay Peninsula, Java, Sumatra, Philippines, Palawan, Mexico, Central America, Africa, Celebes, Ceylon, Hyderabad, Madras, Bengal, Kashmir and other parts of India; Arabia, New Zealand, and the islands of Raratonga, Tongatabu, Tahiti, Moorea, Cavau, Hoopei, Toafu, Samoa, Savaii, Fiji, Taviuni, Hawaii, Lifuka, Marquesas, Parnoutou, and many out-of-the-way corners, all localities where paper, in one form or another, at some period, has been fabricated.

Most of the equipment and tools used in China, which are included in the Museum specimens, consist of vats, moulds, and tools used for macerating the fibre. There are, in the Museum, specimens of all the Chinese papers. A great deal of the paper in China is used for religious or ceremonial purposes. This paper is made, mostly, of bamboo and rice straw. Much of it is devoted to burnt offerings, and used in the Chinese temples, both in the Buddhistic and Taoistic religions.

Dr. Hunter has a kimono of paper, gaily colored, which is burnt at Chinese funerals, so that the one, who passed on, will have plenty of clothing in the next world. Some comparatively small pieces of paper, perforated with the famous nine holes, each approximately one-eighth of an inch in diameter, are flown in the air as the coffin passes from the house to the grave. This flying of paper is done with the idea that the evil spirits pass through the nine holes, and, by the time the cemetery is reached, these evil spirits will have been retarded, and eventually lose their energy. Bamboo papers, containing paper money, are burnt outside the grave. On most of them are characters signifying longevity, happiness, and contentiment in the other world. At least half of these Chinese handmade papers are used in religious ceremonies.

Various kinds and sizes of papers are used in the Chinese house. Sheets of rice straw and bamboo paper, bearing pictures of gods, are placed in the rooms, to ward off the evil spirits. Some papers contain prayers. Circular pieces of paper, with scalloped edges, about five inches in diameter, called mantras, are burned before the family portraits, usually at the Chinese New Year holidays. Wedding papers are usually red in color. There are specimens, also, of a gambling paper, used in the game of fan tan, the score blotted out with the lighted end of a cigarette.

Papers for printing purposes are made from mulberry bark. A very large sheet, in fact, the largest, is 48 x 84 inches. Newspapers are made of ground repulped paper.

There is a complete collection of papers from Korea in the Museum, used for writing, printing, and windows, the latter in place of glass. All the floors in Korean houses are of wood, with mulberry bark paper on top.

The collection includes papermaking moulds and appliances from China, Korea and Japan, with the original type of "wove" mould, such as Ts'ai Lun used when paper was invented in the second century, A. D. Original style of "laid" transfer mould is on display. This transfer mould was the first real step in papermaking development, and, upon its construction, rests all modern papermaking, both by hand and by machine.

There are specimens of early Chinese papers, dating from the sixth century onward; paper money from the earliest times. Chinese were originators of currency

of this kind. There are, likewise, examples of all types of other ceremonial papers, as well as old and modern writing papers, visiting cards, and many forms of decorated paper, also used in the Buddhistic and Taoistic religions. Eighteenth century screen papers, and the blocks used in their printing, have been revised as wall decorations throughout the Museum. Largest handmade paper in the Museum measures 48 by 84 inches, and was made during the latter part of the Ming Dynasty for the use of Chinese painters.

The Japanese exhibit includes all forms of papermaking moulds and tools used in manufacturing the paper that may be considered the finest and most unusual produced in the world, previous to the war. Such papers were made in Shimane, Kochi, Fukui, Okaydma, Nagano, Gifu, and other celebrated papermaking provinces of Japan. Koreans, the first artisans to color paper in the vat, were also the first workers to make envelopes, antedating even the ingenious Chinese.

The Museum has on display some of the earliest colored papers, dating from 1580, and examples, too, of the imperial envelopes of Korea, all in their original brilliant tones, that have not faded, in the least, during their long existence. Many of these Korean papers were found in old Chinese temples, where they had been stored for purposes of calligraphy, long before the Chinese knew the secret of coloring paper in the vat.

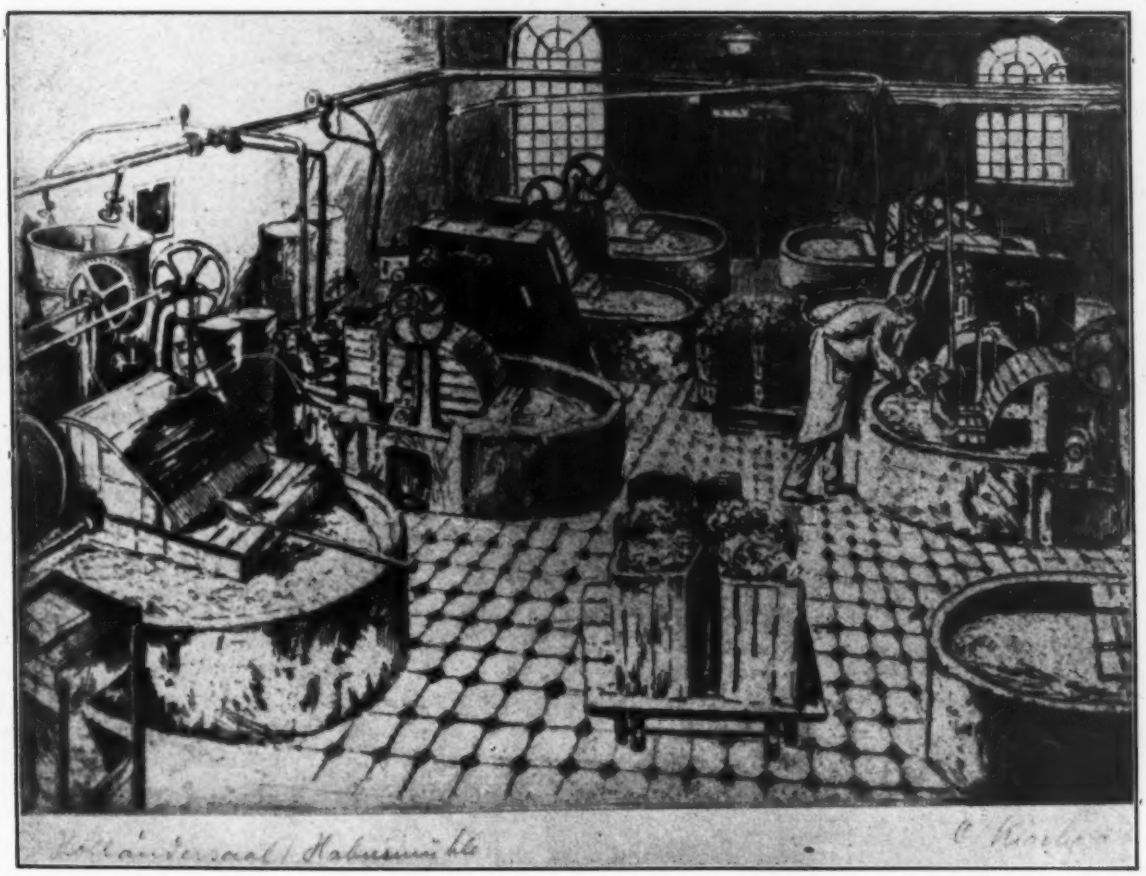
One of the Japanese moulds shown is capapbe of forming sheets of paper, measuring three by six feet, the largest handmade paper in Japan in a mould.

In Japan, this paper, termed "shoji," is used in lieu of glass in the windows of old-time Japanese houses. Japanese paper, made from mulberry, mitsumata, a plant growing in three branches—mitsu meaning three —and mata, branch, and gampi, as well as these exceptional materials in their natural state, may be seen. It can be said, without reservation, that the most artistic and most extraordinary papers, produced in the world, have their origin in the small mills of remote rural districts of Japan.

From India, there are various types of grass and bamboo papermaking moulds, including appliances from Punjab, Central Provinces, United Provinces, Hyderabad, Bengal, and from the age-old paper center of Nowshera, a province in southern India, are, for the most part, of jute and hemp. The Mazan, highest in rank of Indian princes, and the richest man in the world, sponsors the papermaking in that province. Papers there are used for manuscripts and account books. There are numerous account books at the Museum.

There are papers from Kashmir, and other part of India, made of linen and cotton cloth by beating and stamping. Much of this paper is used for manuscripts.

Washers and Beaters, Hahnemühle



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

A Dutch paper label from the beginning of the nineteenth century. Term "Super Fine Fine" was a favorite with the manufacturers of paper in Holland, especially for the English and American Trade.

Tools used in finishing Kashmir paper are shown, as well as the various steps in the preparation of paper for Kashmirian and Persian calligraphy, so cherished by collectors of Oriental manuscripts.

The collection includes papers formed by students in Mohandas Karamchand Gandhi's school of papermaking, in Wardha, where the Mahatma has his home, and where he is endeavoring to place papermaking on an equal footing with weaving, as a cottage industry. It is Mr. Gandhi's hope that papermaking and weaving will eventually be the salvation of India's destitute millions, freeing the country, to a great extent, from the necessity of importing paper and cloth.

In the Paper Museum may be inspected the earliest laminated paper board, in the form of a small Persian coffin, dating from a remote period; pasteboard from Tibet and Mongolia, antedating by many years any attempts of this manufacture in the Occident. One exhibit is a collection of paper, fabricated by prisoners in Indian jails, before this work was officially abolished. Abolishment was probably due to the severe criticism of the practice by John Lockwood Kipling, Rudyard Kipling's father, curator of the Lahore Museum from 1875 to 1893.

Visiting, in 1934, the last remaining handmade paper mill in southern Siam, Dr. Hunter was able to acquire moulds and appliances from the ancient center of Bangsoom, a very tedious journey from Bangkok, through narrow winding canals, arched with khoi trees, the bark of which has, for centuries, furnished the Siamese papermakers with their raw material. From the fibre of khoi is produced a coarse paper used for religious writings. Stained black, it is written upon in yellow.

From Indo-China is paper made of daphne, a plant grown in that country by cultivation, which is wild in Nepal. This paper is employed in writing and some printing. Indo-China is represented, also, with appliances from the ancient paper villages of Yen-Thai and Lang-Buoi, Tonkin Province, where paper has been made continuously, along the same muddy roads and lanes, for more than six hundred years.

Southern Shan States of Burma have long been noted for their highly-colored umbrella papers, and specimens from Mong Keng, Keng Tung, and Lawksawk are on display. There are primitive papers and the tools used in their manufacture from many of the South Pacific Islands, from Java, Central America, Mexico and Africa. Nearly every country of Asia, where paper is made, has found at least a small niche in the Museum.

In Manchuria, a little papermaking is done, practically by the same methods followed in China, mostly of mulberry bark. In Java, the paper is made of mulberry bark, but by a different technique. It is a beaten paper, pounded out with mallets, until it is of a fine texture. This paper became clothing, as was worn in all the South Pacific Islands, and for bedding, also. A piece of this paper, 6x12 feet, decorated, from Tonga, hangs in Dr. Hunter's office. Some 50 years ago, cloth was introduced in the South Pacific Islands for wear, so that this paper has become of use for decorative purposes.

Papers from Sumatra are made of mulberry bark, by the same technique employed in Java. In Palawan, one of the numerous Philippine Islands, from which papers are shown, the product is made similar to that in Java.

From Mexico are papers produced by the Otomi Indians, from ficus, a species of the fig tree, by a technique varying from that followed in any other country. From Central America is shown a beaten paper, similar to that of the South Sea Islands, but cruder. This paper is formed, also, from ficus, and is worn as clothing. Specimens of paper from Africa are similar to those from Central America. From Celebes is paper of beaten mulberry bark.

From Madras is paper made from jute and hemp, In Rajahmundry, Madras, is a school for making paper by hand, founded by Dr. Hunter in 1936. Here the paper is made in a mould from pulp. Product shown from Bengal is of jute and hemp, made in a mould. In New Zealand, the Maori natives formerly made a paper of mulberry bark, but do not produce any there now. From Raratonga are specimens of paper, called tapa, of beaten mulberry bark. This product was originally used for clothing, but, except for special occasions, is not in vogue so much in these times. Fragments of paper from the Maya civilization, 800-1100 A. D. are shown.

Mulberry bark predominates, also, in specimens displayed at the Museum. Oldest papers, extant, and

shown in the Museum, are produced from the fibre of mulberry bark, dating from the fifth century, A. D. Paper from mulberry bark has a highly adaptable printing quality. Almost pure cellulose, it ranks with cotton and flax as papermaking material. Fibres employed are obtained from a layer of bark between the cortex and the stalk of the tree.

In the Museum cases may be studied the first European textbooks relating to papermaking, dating from 1568 to the middle of the nineteenth century, including the earliest delineation of a papermaker. This engraving was executed by Jost Amman. Beneath the charming old print may be read a verse by Hans Sachs, the cobbler-poet of Nurnberg, praising the art of papermaking.

Following is the verse, translated from the German by Dr. Hunter:

"Rags are brought into my mill
Where much water turns the mill.
They are cut and torn and shredded
To the pulp is water added;
Then the sheets 'twixt felt must be
While I wring them in my press.
Lastly hang them up to dry
Snow-white in glossy loveliness."

The collection of books and prints covers practically every known item relating to the subjects of papermaking by hand, and the water-marking of handmade papers.

The Paper Museum enters into the field of watermarking by displaying the various tools and equipment used in producing the finest light-and-shade papermarks. Watermarking is traced, with original specimens, from the beginning of the art, in 1282, to the most modern type of portraits. Difference between a handmade paper watermark and a machine-made emblem is given, with a comprehensive history of trademarks in paper. The Museum is fortunate in having all of the original experiments of Sir William Congreve, the inventor of colored watermarks. These papers embrace the actual papermarks made by Sir William in 1818 for the Bank of England, and, in this exhibit, the first three-color watermark ever made may be studied.

One of the instructive exhibits consists of a full-size equipment for the making of the finest handmade papers. This equipment, procured in southern Eng-

Paper Inspecting Room of the Hahnemühle

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

For the American Trade

A European paper label, formerly used by the well-known Dutch papermaker, Blauw. This ream label is from the beginning of the nineteenth century, and bears the accepted term "Super Fine Fine," used to influence English and American customers.

land, and brought to America especially for the Museum, is the only complete apparatus of its kind in this country.

There are specimens of paper from every country in Europe, papers decorated by lithography, wood blocking and stained. These papers, of which there are a good many thousands of varying designs, are used for bookbinding. These are handmade papers with surface decoration, but in varying techniques.

European papers may be marbled or decorated with colored rice paste in various colors, in lithographed all-over wood blocks, in many different colors.

Included in this collection are Italian papers, printed from wood blocks. For example, there are some in gold and blue. Old wood blocks, employed in making these papers, are in the Museum. Some have beautiful flowers as the pattern. Some are in conventional designs, also.

Museum contains approximately 20,000 designs in bookbinding papers, from all parts of the world. In the Museum are books in which papers, similar to those displayed, are seen, in both old and modern volumes. There are also specimens of papers made in the United States for bookbinding purposes.

In the display cases of the Museum may be studied the first European textbooks relating to the craft of papermaking. Development of materials, from which paper is made, is graphically shown by the first use of the fibres of wood, straw, corn-husks, nettles, cattails, potatoes, and dozens of other fibres that have been used in the manufacture of paper. All told, more than 2,000 different vegetable fibres have been used in the paper industry.

Dr. Hunter says that, when he began collecting material relating to papermaking, he had originally no thought whatever that the assemblage would ever form a Museum. Papers, tools, and appliances were gathered in all parts of the world, for no other purpose than to be used in the compilation of books on the subject of papermaking. Immediately after each book had been completed, the various tools, that had been used for taking measurements and photographs, were stored away as of no further use or need. After the tenth book had been written and illustrated, the hundreds of papermaking appurtenances began to assume the proportions of a Museum.

Knowing of this collection, Dr. Karl T. Compton, president of the Massachusetts Institute of Technology, conceived the idea that the material should be made available, and, at his request, the Paper Museum was formed, the only Museum of its kind.

Original part of the collection, dealing with Occidental paper, was acquired in Europe, many years ago. On one journey to England, the complete equipment of an old paper mill in Downton, Wiltshire, was purchased, and the seventeen tons of iron, lead, brass, and bronze appliances finally reached America, where they were eventually used at Lime Rock, Connecticut, for the making of handmade papers. This is now the only fully equipped mill for the making of papers of this kind in the Western Hemisphere.

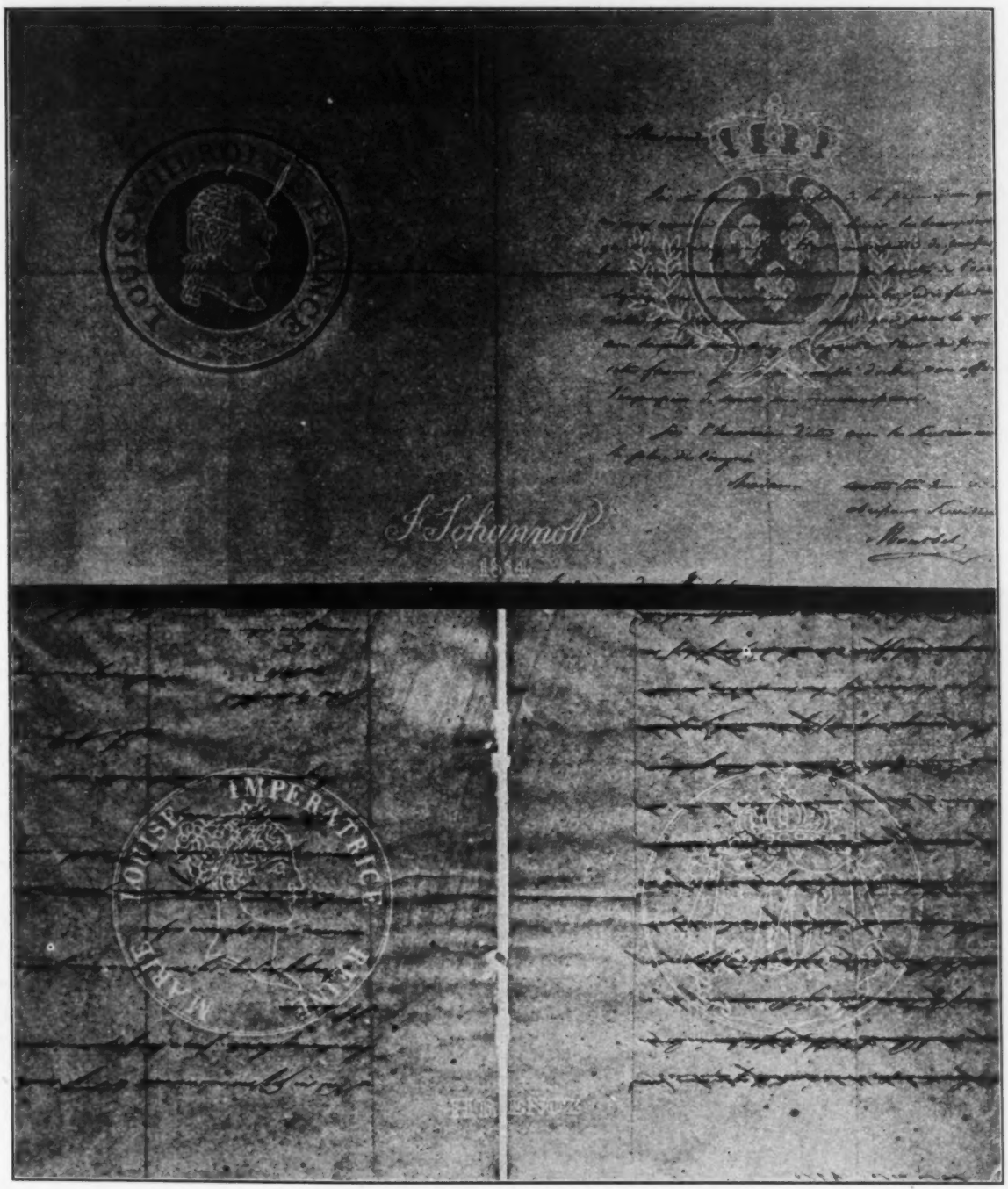
In later years, the equipment of another handmade paper mill was acquired in England, from a long-established mill in Somersetshire. These appliances embrace the vat, agitator, bridge, lifting-box, and knotter, and date from about the year 1830. The huge paper press, from the same mill, was stoutly built of English oak during the latter eighteenth century. This early equipment, weighing almost five tons, was brought to America especially for the Paper Museum. Dr. Hunter says: "Oddly enough, I made paper at this same vat twenty-five years ago, when the equipment was in actual use near Wells, Somerset. But, at that time, I little thought that, in years to come, I would 'collect' this massive material for museum purposes."

Material in the Paper Museum from Asia, the South Pacific Islands, and other places, has been gathered from the actual workers, and every appliance has seen useful service. Dr. Hunter relates: "In the Far East I have had the pleasure of photographing and making measurements and drawings of hundreds of handmade paper mills, and it has been my rare privilege to have had the opportunity of becoming familiar with the many techniques of practically every paper-

making province of Asia. In Japan, we made a census of the mills, and well over a thousand small establishments were listed. In China, we estimated that there were more than thirty-five thousand individual farm mills, where sheets of paper were formed by the old traditional hand-method. In Indo-China, I have seen hundreds of separate mills in operation. Making of paper by hand is not obsolete, except in the Western Hemisphere. In fact, throughout the world, there are more men and women employed in making paper by

Over One Hundred Years Old

Two sheets of letter paper, with portrait watermarks, made previous to the invention of the light-and-shade process, invented in England during the middle-nineteenth century. Upper example was made in the Johannot mill, Annonay, Ardeche, France, in 1814.



(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

hand than there are in producing paper on machines.

Dr. Hunter has published several books on papermaking, a good proportion printed at his own press. American Notes & Queries, for April, 1947, says:

"**The Mountain House Press**, at Chillicothe, Ohio, has acquired a reputation that need not be elaborated upon. Its founder, Dard Hunter, reports that the eighth title to come from the Press will deal with early American papermaking, and will be issued in a rather thick folio volume, printed in type cut by Dard Hunter, Junior, on paper made in their own mill in Lime Rock, Connecticut. There will be 200 copies (a figure determined by actual limitations, and not through any desire to create a false rarity). A price will not be set until the books are completed.

"All of the work at the Press is done on two hand presses. The types are hand-cut, and the matrices adjusted by hand. The type-founding is done by Dard Hunter, Junior. (Dr. Hunter's own sight is too much impaired for exacting work of this kind, at present.) The Hunters use hand-operated casting machines, in order to produce a better face than would handmoulds; and they are equipped to cast any letters or ornaments from six to seventy-two points.

"The last-published title was 'Papermaking in Indo-China'; the 182 copies were printed from type designed and cut originally by William Caslon, in London in 1720.

"The Hunters divide their time between the Mountain House Press, in southern Ohio, and the Paper Museum of the Massachusetts Institute of Technology. They expect next year to gather additional material in the Orient."

Following is a complete list of books written by Dard Hunter:

Handmade Paper and Its Watermarks: *a bibliography, New York, 1916;* A History and Bibliography of Marbled Papers: *New York, 1921;* Bibliographie de la Papeterie: (*translation*) *New York, 1921;* Laid and Wove: *Smithsonian Institution publication, Washington, D. C., 1922;* *Old Papermaking: *Chillicothe, Ohio, 1923;* Modern Handmade Papermaking: *New York, 1925;* *The Literature of Papermaking, 1390-1800: *Chillicothe, Ohio, 1925;* Fifttenth Century Papermaking: *New York, 1927;* *Primitive Papermaking: *Chillicothe, Ohio, 1927;* Watermarks: *in Encyclopaedia Britannica, 14th edition;* Papermaking Through Eighteen Centuries: *New York, 1930;* Papermaking in the Class Room: *Peoria, Illinois, 1931;* *Old Papermaking in China and Japan: *Chillicothe, Ohio, 1932;* A Papermaking Pilgrimage to Japan, Korea, and China: *New York, 1936;* *Papermaking in Southern Siam: *Chillicothe, Ohio, 1936;* *Chinese Ceremonial Paper: *Chillicothe, Ohio, 1937;* Papermaking by Hand in India: *New York, 1939;* Papermaking, The History and Technique of an Ancient Craft: *New York, 1943;* *Papermaking in In Indo-China: *Chillicothe, Ohio, 1947;* Papermaking. *2nd edition, published by A. A. Knopf, Inc., New York, 1947;* and Before Life Began, 1883-1923 (autobiography) *New York, 1941.*

(**Printed and published by Dard Hunter*)

Incidentally, Dr. Hunter has never published a book at the Chillicothe Press which has not increased in value from twice to five times.

A New York City dealer in rare books describes in a catalogue the book, "Chinese Ceremonial Papers" as "A monograph relating to the fabrication of paper and tin foil, and the use of paper in Chinese rites and religious ceremonies. Illustrated, and with a number of fine specimens of Chinese paper tipped in, quarto it comes from (Chillicothe) The Mountain House Press, 1937, in only 125 copies, signed by the author, with bookplate. With the original price $30, the book was sold by the dealer at $90.

"Old Papermaking," published in 1923, the first book written by Dr. Hunter on the subject of paper, of which the original price was $25, was sold at auction recently by a New York dealer in rare books at $125. The book contains specimens of paper and other illustrations, quarto original boards, uncut.

"The Literature of Papermaking, 1390-1800," published in 1925, of reproduction, folio, loose in a half-cloth portfolio. Original price was $30, but sold, eventually in single copies at $90.

"Another book, "Papermaking in Southern Siam," (Chillicothe), was privately printed by the author, 1936, with 17 photographs, with original bark and paper specimens, in quarto decorated paper sides, morocco back, is one of only 115 signed copies. With the original price at $27, the book sold eventually at $50.

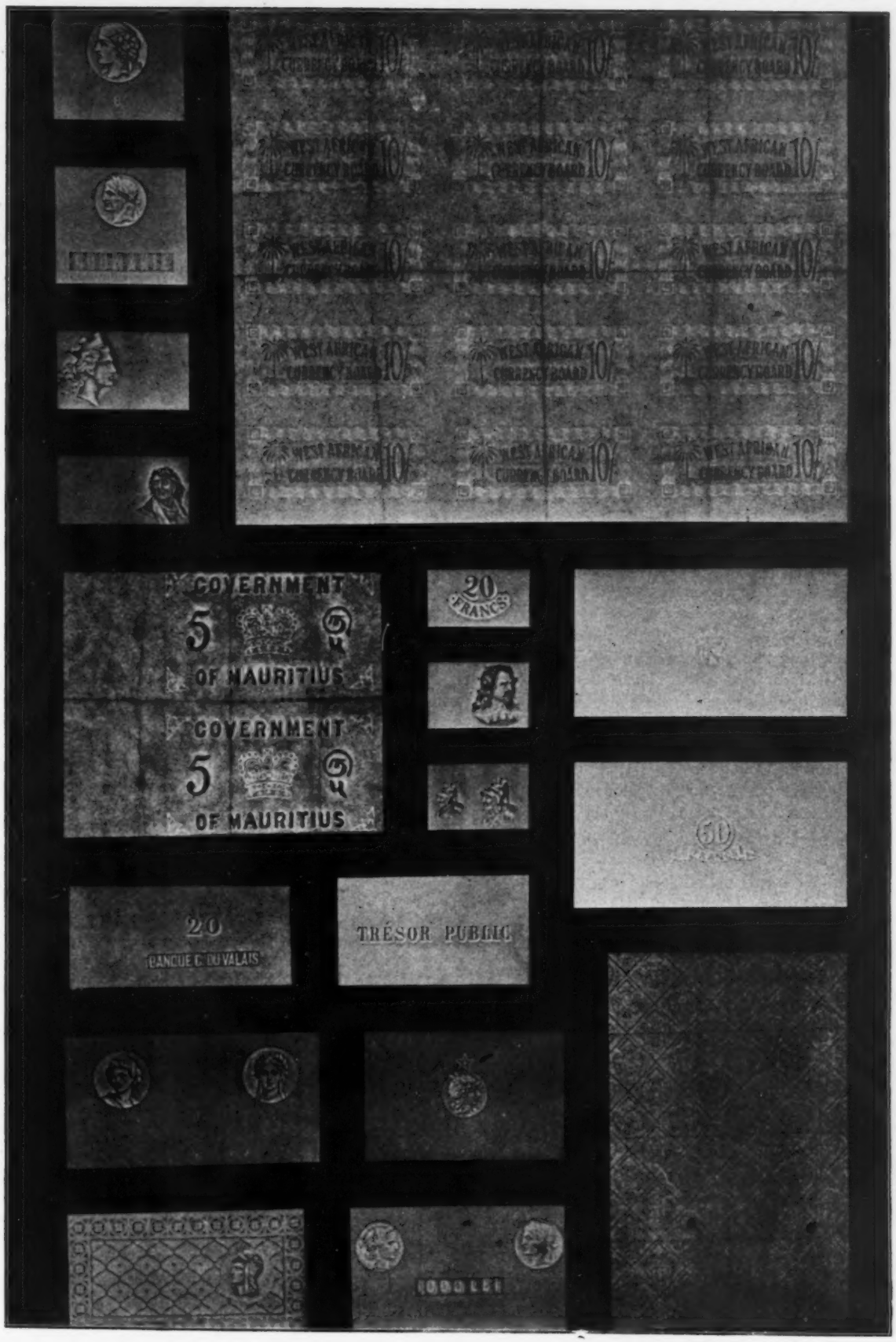
"In the Colophon, Part VII, Dr. Hunter says: 'It is my desire to take up my home in a far-off island, and, without any materials, tools or appliances of civilized countries, to print a book.' The announcement says further: 'So far, this idealistic day-dream has not materialized.' In the meantime, Dard Hunter has approached it to the extent of making his own paper, designing and casting his own type, and printing his own books—which combination of tasks and ability seldom has been found centered in one man since the 15th century."

The Museum enters into the field of watermarks by displaying the tools and equipment used in producing the finest light-and-shade paper-marks, including many

(Picture, Opposite Page—)
(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Money Is Made from This Paper

Modern light-and-shade watermarking, made in England, France and Russia. These are unprinted money papers, and, at the top, may be seen a sheet of fifteen notes previous to being engraved for the West Africa Currency Board. At the lower right side is shown a Pre-Revolution Russian money paper. Folds in the papers were caused when the workmen smuggled the sheets from the mills; papers of this kind are not easily procured, even for museum purposes.


WEST AFRICAN CURRENCY BOARD 10/-
GOVERNMENT 5 OF MAURITIUS
GOVERNMENT 5 OF MAURITIUS
20 FRANCS
20 BANQUE C. DU VALAIS
TRÉSOR PUBLIC
50

of the original experimental papers made by the inventor of the process. Watermarking is traced with original specimens, from the beginning of the art in 1282, to the most elaborate portrait watermarks of the present day. These watermarks include one of Dr. Hunter and one of Elbert Hubbard, with whom he was associated for nine years at The Roycrofters, East Aurora, New York.

Watermarks also include one of Lord Byron, and one of Harry Worcester Smith, both done by Dr. Hunter. Other watermarks include Russian passports of the sixties; a United States passport with a large spread eagle; Mount Fuji, Japan; and Italian note of the Banca D'Italia, lire mille, made in such a way that it is difficult to counterfeit.

The Museum is fortunate in having all of the experiments of Sir William Congreve, the inventor of colored watermarks. These papers embrace the actual examples made by Sir William in 1818 for the Bank of England, during the period the Bank was having no end of difficulty with counterfeiting.

There are thousands of specimens of plain and decorated papers from every country: papers used in book printing, in bookbinding, and for every branch of the graphic arts, in both the Orient and the Occident. The collection of books and pamphlets, on the subjects of early papermaking and watermarks, includes every known work, and the assemblage of old prints, showing the craft of papermaking in Asia and Europe, is most extensive. The Museum makes no pretext of being complete—no collection, no matter how long in the process of formation, is ever finished. It is the desire to add to the collection, and, as worthy items are found, they are acquired, but each year it becomes increasingly more difficult to locate material that is not already duplicated in the Paper Museum.

Work of the Museum covers a wide field. Dr. Hunter receives requests, some in person and some by correspondence, from those who wish to gain certain knowledge about particular papers. For instance, during the writing of this article, he received a piece of wall paper, taken from the room where George Washington died at Mount Vernon in 1799. What was desired to be determined was whether or not this particular paper was in the walls of the room when Washington died. The piece of paper, somewhat faded, bears a conventional pattern, including an urn, with drooping bowknots and flowers, printed in water color in white and gray. This piece of paper was brought to Dr. Hunter by the restoration committee of Mount Vernon.

Another piece, brought in at the same time, was about the size of a postage stamp, the only fragment remaining of a green wall paper. There is an account book, compiled by General Washington, in which he mentions ordering a green wall paper from France. Question to be answered was: is the section of green paper a part of the original green paper ordered from France by Washington? If it is found that such is the case, the restoration committee will have that paper reproduced. With it, they will cover the walls of the room where the green paper is supposed to have originally been used. This paper is of solid green, but there is a pattern in the border, which the committee is fortunate in possessing.

Other cases include the discovery of forgeries of prints, wills, letters, and documents of all kinds, as well as pamphlets. Anyone interested in old paper sooner or later writes to Dr. Hunter.

Dard Hunter went to Elbert Hubbard's printing establishment in 1903, when he was 19 years old. At East Aurora, his work was in connection with book printing,

Dr. Hunter was a student of Ohio State University, and later graduated from the Graphische Lehr und Versuchsinstalt, Vienna, and Royal Technical College, London. He has honorary degrees Litt.D., B. Litt., and Lhd.

In his autobiography, he says: "Perhaps my greatest satisfaction has come to me through my two sons, both born in the enviroment of my experiments in paper making, type founding and book printing. Dard, Jr., inherited antiquarian tendencies, and he is steeped in the lore of past ages, while Cornell Choate is essentially modern in every thought and deed, and shows a genuine disdian for anything that even suggests the past. Dard, Jr., is destined to carry on my work, and, during the past three years, he has been making a font of type by using only the tools and materials available to the typefounders of the fifteenth century. Cornell Choate, in direct contrast, operates his own amateur radio station, and has chosen communication engineering for his life work. I am well satisfied that the two boys are opposites in their characteristics and temperaments— from both I have gained knowledge and understanding."

A new building will be erected eventually for the Massachusetts Institute of Technology, in which larger quarters will be provided for the Dard Hunter Paper Museum.

Dr. Hunter says of his work:

"The Paper Museum of the Massachusetts Institute of Technology, Cambridge, Massachusetts, was established in 1938, and, during this nearly ten-year period, there have been thousands of visitors, from all parts of the world, embracing dozens of different countries. Visitors are from all walks of life, which gives the

---

(Picture, Opposite Page—)
(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Difficult to Counterfeit

Examples of finely executed plain and colored watermarks, made in Italy and France, during the past thirty-five years. At the top left corner is shown an elaborate light-and-shade watermarked paper, formerly used by one of the large New York banks for letters of credit. Watermarked papers of this sort are extremely difficult to counterfeit, as the skill required to make the moulds, as well as the paper itself, is well beyond the limitations of a novice.

BAKER TRUCKS cut Pulp-Handling Costs at Nekoosa-Edwards Paper Mills

How Baker Lift Trucks and skids can cut costs of handling heavy, bulky material is demonstrated in the two mills of The Nekoosa-Edwards Paper Company at Nekoosa and Port Edwards, Wis. Pictures and captions tell the story.

Incoming materials such as bagged starch are unloaded with Baker Low-Lift Trucks. Bags are placed on skids in the cars, and skid loads carried to beaters on the trucks. Surplus stock is stored on skids.

At the deckers, wet laps of pulp are folded and piled on skid platforms. Truck keeps deckers supplied with empties and picks up loaded skids, transporting them to scales for weighing, and then to temporary storage.

Wet laps remain on skids in temporary storage until delivery to beaters. About 1850 standard 36" x 60" metal platform skids are in use in both mills. Unit loads average about 3600 lbs. wet weight.

Three deckers normally operating continuously in the two mills produce about 365 skid loads or 650 tons per day. When temporary storage cannot accomodate stock on skids, Hy-Lift Trucks do the heavy lifting for high piling — the wet pulp being too soft for tiering on skids.

Wet-lap pulp on skids is interchanged between the two mills — four miles apart — by the company's own railroad. Box cars accomodate 20 skid-loads per trip. Loading and unloading is completely mechanized by Lift Trucks available at both mills.

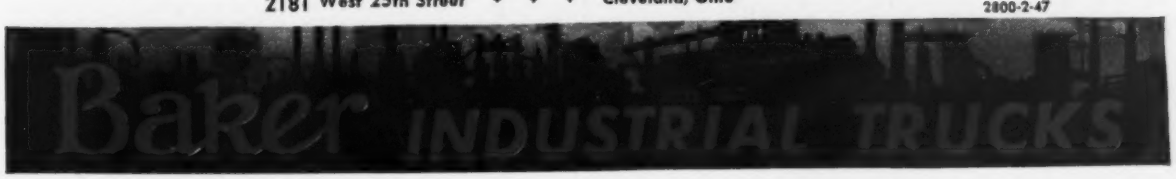
Truck operators are held responsible for keeping the 26 beaters at both mills supplied with skid loads of wet-lap pulp from temporary stock piles—also for removing empties, returning them to deckers, and removing pulp from deckers to keep production moving.

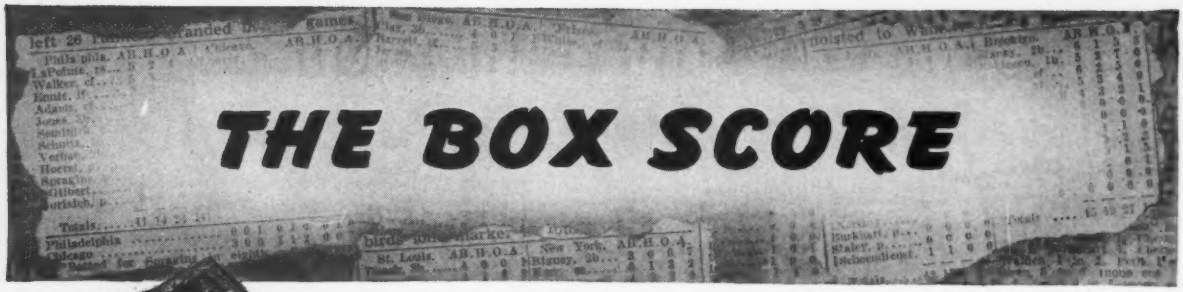
Baker Trucks at Nekoosa-Edwards are up to 18 years old — and still going strong!

If your problem is handling heavy, bulky materials, a Baker Material Handling Engineer can show you how to cut costs.

BAKER INDUSTRIAL TRUCK DIVISION *of The Baker-Raulang Company*
2181 West 25th Street + + + Cleveland, Ohio

2800-2-47





Makers of fine paper boxes have made many hits and no errors with Arabol Adhesives.

Whether you're interested in set-up or folding boxes or in paper converting in any form, see your Arabol representative when he calls. He knows adhesives and can help you find the types that serve best in your individual case. Arabol has been a pioneer for more than 60 years.

THE ARABOL MANUFACTURING CO.

Executive Offices: **110 East 42nd St., New York 17, N. Y.**

CHICAGO—54th Ave. & 18th St. • SAN FRANCISCO—1950 16th St.

ST. LOUIS—2500 Texas Avenue

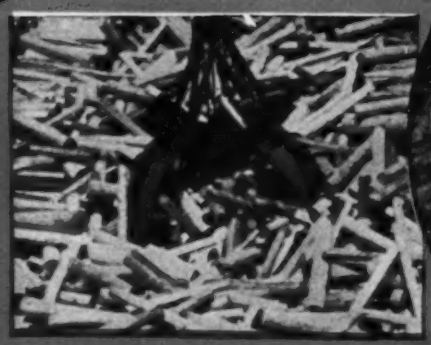
Branches in Principal Cities

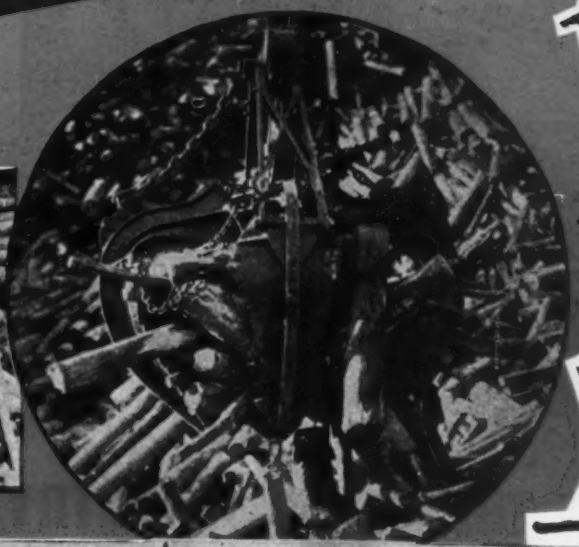
Factories in Brooklyn, Cicero, San Francisco, St. Louis

PIONEERING
in the making of
ADHESIVES THAT WORK

Adhesives?... **ARABOL!**

for the SPEED-UP that CHECKS handling costs





INSTALL

OWEN PULPWOOD GRAPPLES

New York, Philadelphia, Chicago, Berkeley, Cal.

The OWEN BUCKET CO.
5200 BREAKWATER AVENUE, CLEVELAND, OHIO

SERVING THE PAPER INDUSTRY

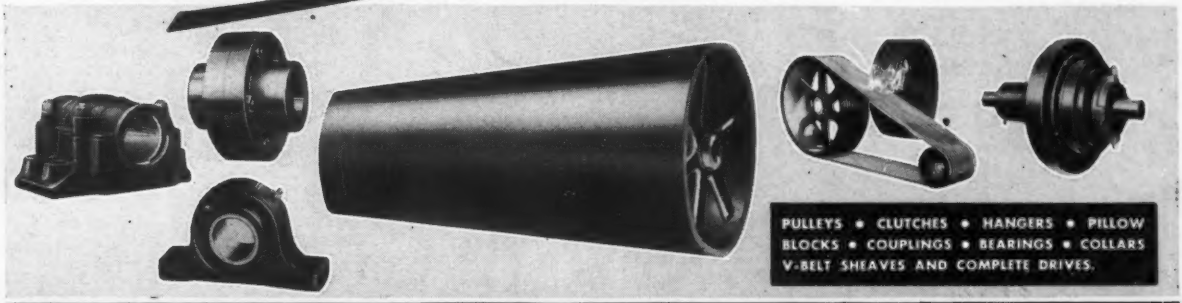
....since 1857

Yes, it was more than 90 years ago that T. B. Wood decided to establish a business devoted to the manufacture of power transmission appliances suited to the requirements of the many strawboard mills and an occasional white paper mill in Pennsylvania, Maryland, Virginia and West Virginia.

And so, under the name of Wood and Housum . . . the original partners . . . was founded the nucleus of the present T. B. Wood's Sons Company . . . . Power Transmission Engineers and Manufacturers.

Through Four Score Years and Ten in One Business, we have continued to grow and serve industry until today, we are producers of one of the most complete lines of power transmission equipment offered by any company. Now, that we might serve industry still better, we have greatly enlarged and improved our foundry, machine shop and plant facilities. An attractive brochure, entitled: "DOING ONE THING WELL THROUGH FOUR SCORE YEARS AND TEN," tells our story. Write for your copy, on your business letterhead, please.

T. B. *Wood's* SONS COMPANY, CHAMBERSBURG, PA.



PULLEYS • CLUTCHES • HANGERS • PILLOW BLOCKS • COUPLINGS • BEARINGS • COLLARS V-BELT SHEAVES AND COMPLETE DRIVES.

BRANCHES: BOSTON, MASS. NEWARK, N. J. PITTSBURGH, PA. CLEVELAND, OHIO DETROIT, MICH.

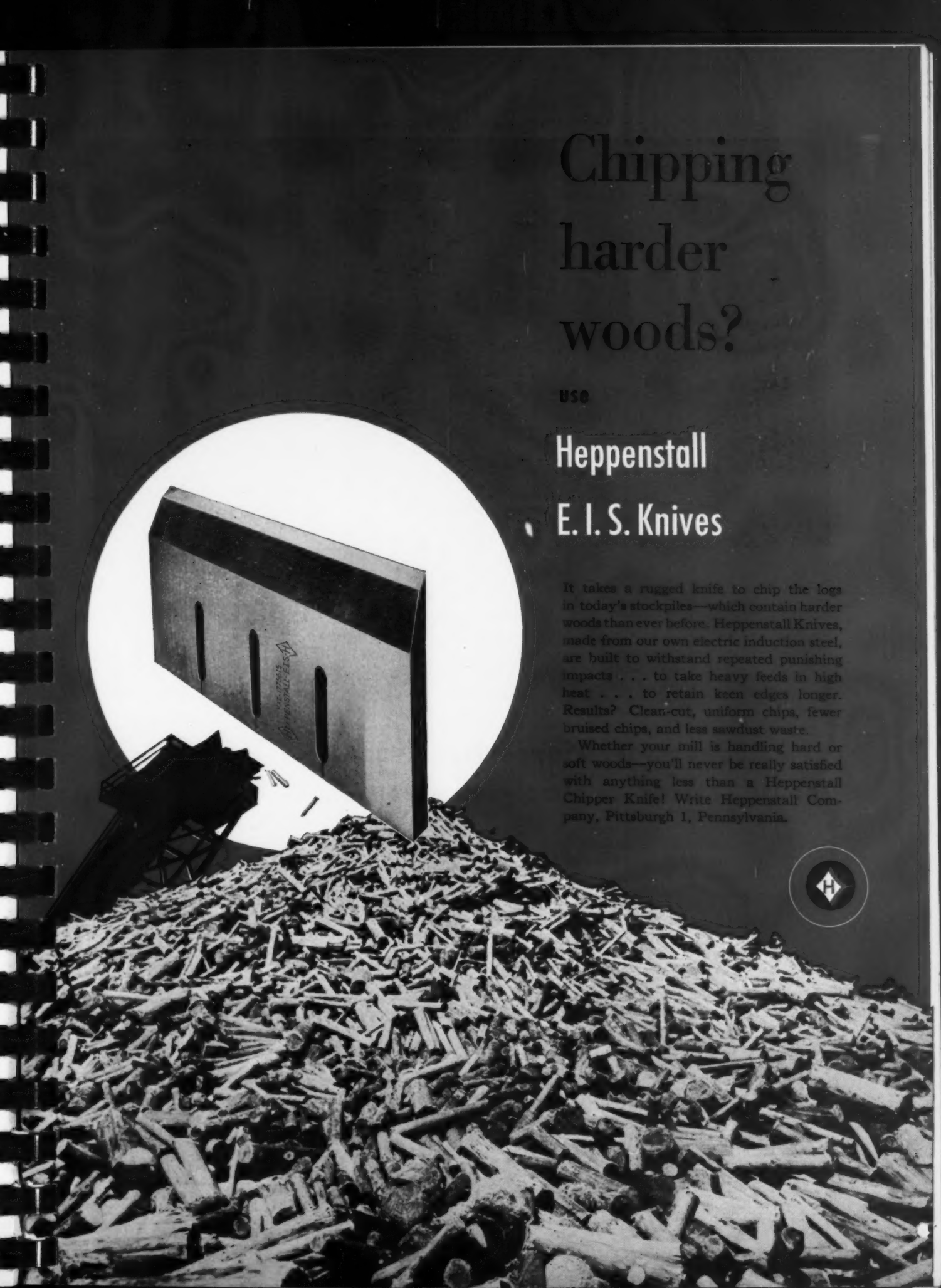
Chipping harder woods?

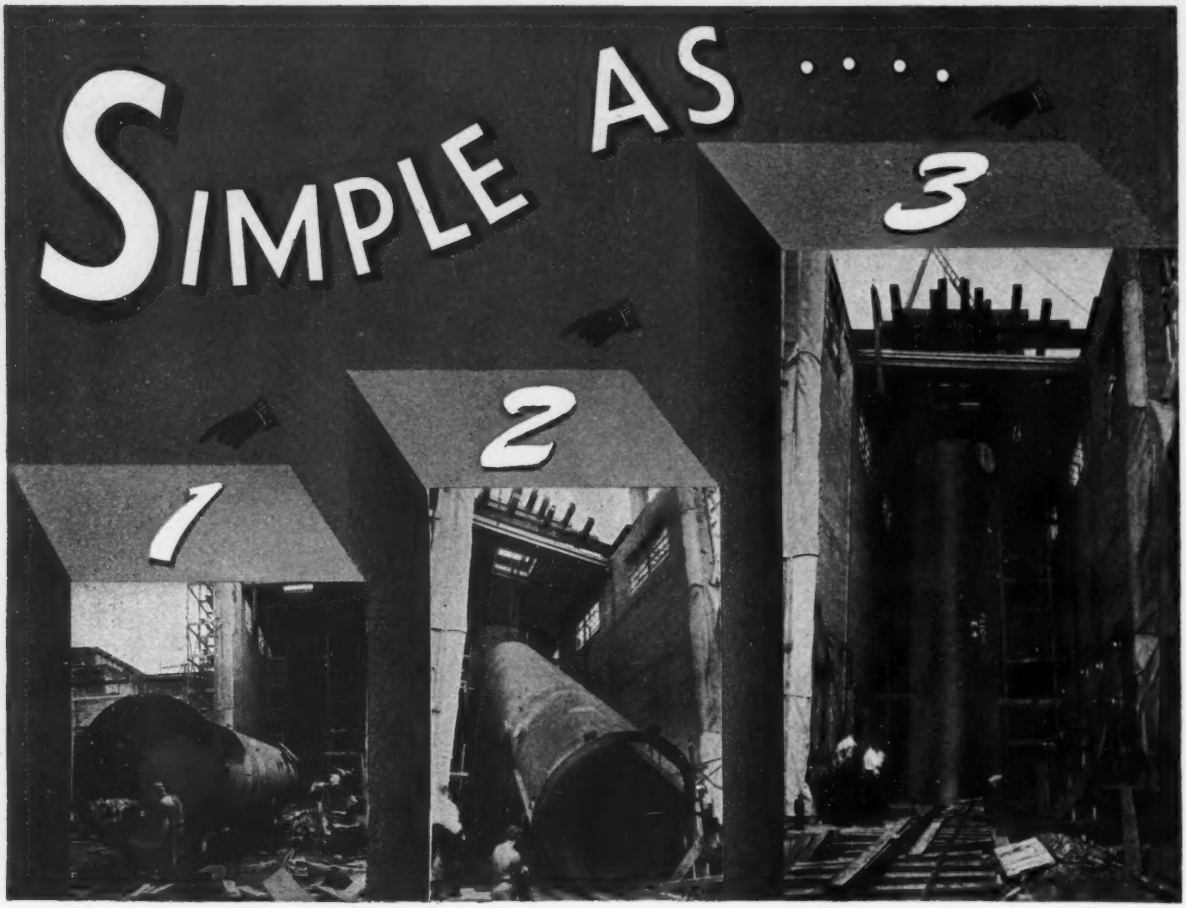
USE

Heppenstall E. I. S. Knives

It takes a rugged knife to chip the logs in today's stockpiles—which contain harder woods than ever before. Heppenstall Knives, made from our own electric induction steel, are built to withstand repeated punishing impacts . . . to take heavy feeds in high heat . . . to retain keen edges longer. Results? Clean-cut, uniform chips, fewer bruised chips, and less sawdust waste.

Whether your mill is handling hard or soft woods—you'll never be really satisfied with anything less than a Heppenstall Chipper Knife! Write Heppenstall Company, Pittsburgh 1, Pennsylvania.





Conkey Self-Supporting Evaporator Effects can be erected as simply as shown in the photographs

In addition to the obvious saving in time and money in the installation of this new type evaporator, consider these proven advantages over conventional evaporator design:

1 – Lower Installed Cost –
- a – No structural supports required.
- b – Low erection costs due to unit effect (Vapor body, heating element and entrainment separator shipped completely assembled).
- c – Less floor space required.
- d – Climate permitting, may be set out of doors.

2 – Operating Advantages –
- a – Lower steam-vapor pressure drop losses.
- b – Fewer points for vacuum leakage.
- c – Real accessibility to outside tube areas for cleaning.
- d – Lower maintenance due to unit construction and absence of structural steel supports.

A General American engineer will gladly give further details to your operating department.

OTHER GENERAL AMERICAN EQUIPMENT

DIGESTERS · FILTERS
TURBO-MIXERS · BINS
THICKENERS · SIZERS
STORAGE TANKS · KILNS
BLOW TANKS · SLAKERS
RECAUSTICIZING PLANTS

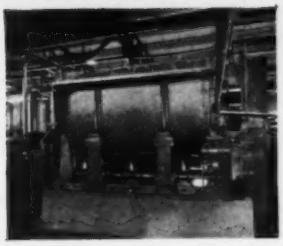
General American
TRANSPORTATION CORPORATION
process equipment • steel and alloy plate fabrication
SALES OFFICE: 10 East 49th St., Dept. 820 New York 17, N.Y.
WORKS: Sharon, Pa., East Chicago, Ind.
OFFICES: Chicago, Sharon, Louisville, Orlando, Washington, D. C. Pittsburgh, St. Louis, Salt Lake City, Cleveland.

PROCESS EQUIPMENT DIVISION GENERAL AMERICAN *

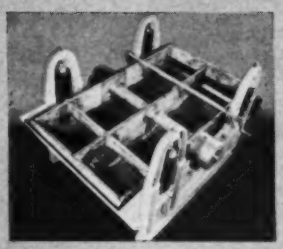
*TRADE MARK

YEAR AFTER YEAR AFTER YEAR

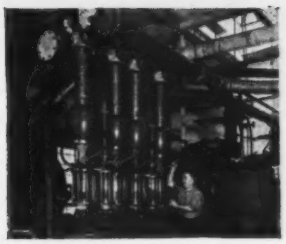
BIRD MACHINERY Keeps Everlastingly At The Job Of Helping You To Make *Better Paper And More Of It Per Day At Lower Cost Per Ton*



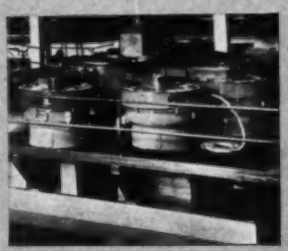
BIRD SCREENS are the standard of the world — handle 80% of all the paper stock in North America. They are essential for continuous, maximum production of uniformly good paper.



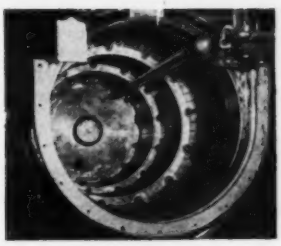
JONSSON SCREENS are ideal for knotting all kinds of pulp with negligible loss of good fibres in the tailings; outstanding, also, for screening defibered wood, straw stocks, waste paper and de-inked stocks.



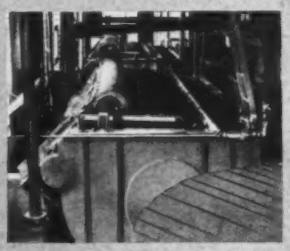
DIRTECS are being widely adopted and endorsed by all kinds of mills as most effective and economical removers of heavy and fine dirt both ahead of the Bird Screens and as tailings units.



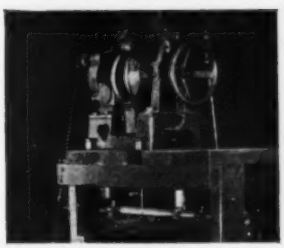
BIRD CENTRIFINERS provide triple centrifugal treatment for separating specks of dirt, metal, rubber, etc. from high grade writings, condenser papers and other specialties.



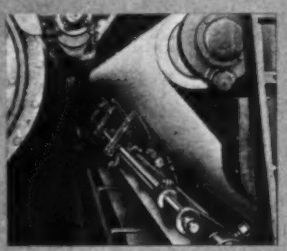
BIRD OSCILLATING SHOWER PIPES keep screens and cylinder molds clean with a fraction of the shower water formerly used. Savings in water, fibre and heat quickly pay for them.



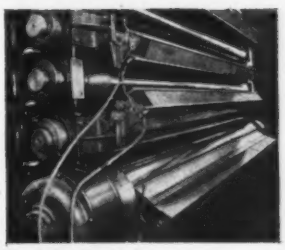
BIRD SAVE-ALLS are the standard means of recovering good papermaking fibres from paper machine waste water. They assure lowest net cost per pound of fibre recovered.



BIRD CONSISTENCY REGULATORS are proving the most dependable and trouble-free means of controlling pulp and paper stock consistency at every desired point. Consistency is held to not more than 0.1% heavier or lighter than desired.



VICKERY FELT CONDITIONERS keep press felts continuously clean and absorbent without midweek shutdowns, improve quality and uniformity and assure maximum water removal at the presses.



VICKERY DOCTORS are engineered for each individual press roll, wire roll, dryer, calender and super-calender roll. Roll surfaces are always clean and shining, in shape to do their best work continuously.

For Bulletins, recommendations, layouts and estimates on any or all items of Bird Machinery, get in touch with

BIRD MACHINE COMPANY

SOUTH WALPOLE • MASSACHUSETTS

TAYLOR-STILES

and Company

was 9 years old in 1872

— when we ran our first advertisement in the first issue of "Paper Trade Journal."

Taylor-Stiles advertisements have appeared every month in this magazine since then.

TAYLOR, STILES & CO.,
RIEGELSVILLE, WARREN CO., N. J.,
Manufacturers of THEIR IMPROVED GIANT RAG CUTTERS,
Fly Bars, Bed Plates, Rag Cutter, Barker and Chipper Knives; also Paper Trimming Knives.
1872
TAYLOR, STILES & CO.,
Manufacturers of
PAPER MILL ENGINE FLY BARS AND BED PLATES,
RAG CUTTER KNIVES, TRIMMING KNIVES FOR
STRAW CUTTER KNIVES FOR PAPER MILLS,
AND PATTERN KNIVES GENERALLY.
R. R. AND TELEGRAPH STATION, RIEGELSVILLE, N. J.
1897
GIANT
RAG CUTTERS
1922
For the Even Cutting of All Classes of Hard Stock
In Capacities from 1500 lbs. to 10,000 lbs. per hour
Roll Bars ⁘ Rag Cutter Knives ⁘ Bed Plates
TAYLOR. STILES & COMPANY
Riegelsville. N. J. U. S. A.

Congratulations to "Paper Trade Journal" for 75 years of invaluable service to the paper industry.

1863—1948

TAYLOR-STILES and Company

CUTTING MACHINES & KNIVES

10 BRIDGE STREET
RIEGELSVILLE, NEW JERSEY

Volumes of Experience in many fields

BLAW-KNOX products, experience, facilities and engineering knowledge have long been important aids to industry. If your business comes within the scope of our activities we will welcome any inquiries which may lead to our working together for a better, faster, lower cost job.

The following are representative of the services BLAW-KNOX is contributing to industrial progress:

Design and construction of complete CHEMICAL AND PROCESS PLANTS • PROCESS EQUIPMENT and machinery for the chemical and food industries. • STEEL AND ALLOY CASTINGS giving maximum resistance to wear, heat and corrosion. • ROLLING MILLS, AUXILIARY MACHINERY, ROLLS and other special equipment for the steel and non-ferrous industries. • PIPING SYSTEMS for high pressures and temperatures. • AUTOMATIC SPRINKLER, fog and deluge systems. • RADIO TOWERS and antenna supporting structures for all types of broadcasting and communications. • ENGINEERED BUILDINGS for industry and agriculture. • CONSTRUCTION MACHINERY for building roads, airports, and public works. STEEL FORMS • CLAMSHELL BUCKETS • STEEL GRATING • ENGINEERING SERVICE in the design of special machinery and processes for industry at large.

OPERATING AND SALES DIVISIONS

BLAW-KNOX DIVISION
BLAW-KNOX SPRINKLER DIVISION*
BUFLOVAK EQUIPMENT DIVISION
CHEMICAL PLANTS DIVISION*
LEWIS FOUNDRY & MACHINE DIVISION
NATIONAL ALLOY STEEL DIVISION
PITTSBURGH ROLLS DIVISION
POWER PIPING DIVISION
UNION STEEL CASTINGS DIVISION
BUFLOVAK MIDWEST COMPANY

**Operates as a division of Blaw-Knox Construction Company*

BLAW-KNOX
COMPANY

A Pacemaker for American Initiative and Industry

2055 Farmers Bank Building • Pittsburgh 22, Pa.

PAPERMILL AND WOODROOM EQUIPMENT

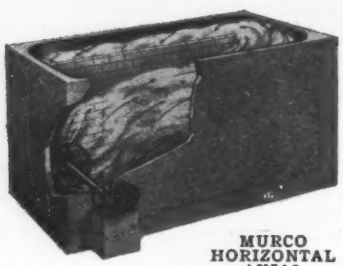
BACKED BY OVER 60 YEARS EXPERIENCE

MURCO VERTICAL AXIAL FLOW AGITATOR

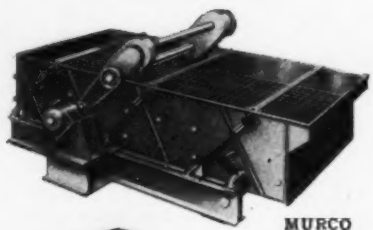
PULPWOOD CHIPPERS

MURCO QUICK OPENING GATE VALVE

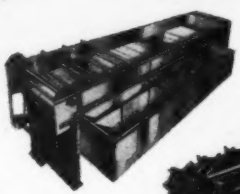
TRADE MARK MURCO REG. U.S. PAT. OFF.



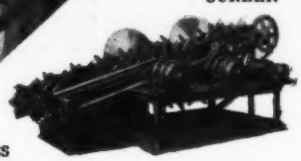
MURCO HORIZONTAL AXIAL FLOW AGITATOR



MURCO LEVEL VIBRATING DOUBLE DECK CHIP SCREEN

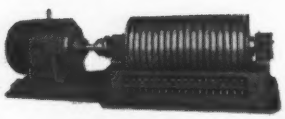


STAINLESS STEEL IMPROVED FLAT SCREEN

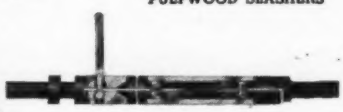


PULPWOOD SLASHERS

Reproduced here are some of the better known Murray Woodroom and Papermill equipment—each item being improved as operating conditions demand more and more production. Let us send you complete details on any equipment required for your papermill or woodroom.

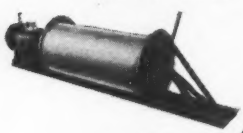


CHIP CRUSHERS

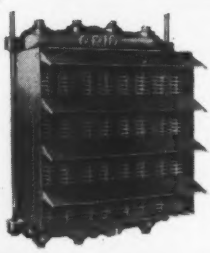


WINDERSHAFTS

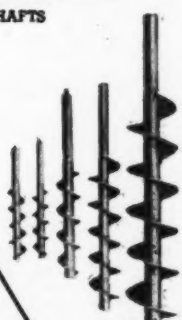
GRID UNIT HEATER AND BLAST COILS



ROLL HEADING MACHINES



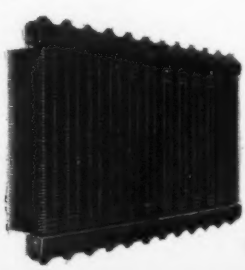
High test cast iron heating sections—one piece construction . . . no soldered, brazed, welded, or expanded connections . . . made to last as long as the pipes furnishing steam to them.



SCREW CONVEYORS AND FLIGHTS

KNOT DRILLS

UNIT HEATER

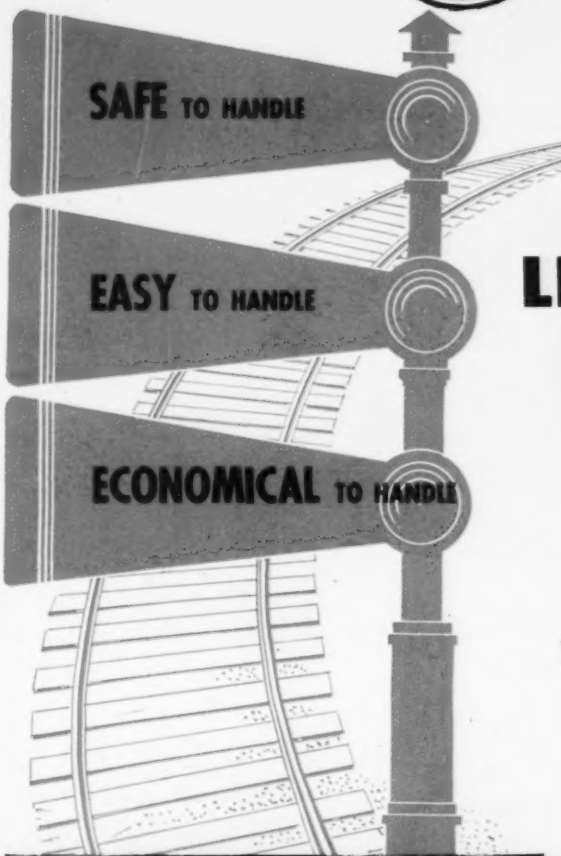


"fin" sections made in one piece

BLAST SECTIONS

D. J. MURRAY MANUFACTURING CO.

WAUSAU, WISCONSIN



50% LIQUID BECCO HYDROGEN PEROXIDE

is the ideal BLEACHING CHEMICAL for PAPER and PULP MILLS when purchased in TANK CARS and stored on the mill site.

● More and more users of Becco Hydrogen Peroxide are finding entire satisfaction in bulk shipments and bulk storage. The simplicity in handling... the quickness of transfer... adds greatly to production and subtracts substantially from costs. 40,000 lbs. in 1½ hours can be handled through the turning of a valve and the pushing of a button.

Becco's fleet of tank cars is the largest in the hydrogen peroxide industry. Becco's representatives will arrange and plan with you for the most efficient tank storage.

Write for complete information.

BECCO SALES CORPORATION

AGENTS FOR BUFFALO ELECTRO-CHEMICAL COMPANY, INC.

BUFFALO 7, NEW YORK

New York Boston Philadelphia Chicago Charlotte

Make the Most of Your Opportunities—with TOWMOTOR

In every plant, large or small, materials handling can be a neglected phase of production that only adds to the cost of the finished product—OR, it can be the source of countless opportunities to streamline production, increasing productive output.

Modern materials handling, with Towmotor Fork Lift Trucks, Tractors and Fork Lift Truck Accessories, provides a controlled flow of materials that insures maximum production efficiency, permits full utilization of overhead storage space, and saves time, money and manpower on every handling job in your plant.

TOWMOTOR CORPORATION, Division 17, 1226 E. 152nd St., Cleveland 10, Ohio

TOWMOTOR *THE ONE MAN GANG*

FORK LIFT TRUCKS *and* TRACTORS

RECEIVING • PROCESSING • STORAGE • DISTRIBUTION

Smith and Winchester was privileged to be one of the first advertisers in Paper Trade Journal and has been a regular advertiser in this publication ever since. Smith & Winchester also pioneered in and developed some of the early paper making machinery. In 1828 it made the first Fourdrinier to be built in this country.

SMITH & WINCHESTER MFG., CO.
South Windham, Connecticut
Paper Mill and Paper Bag Machinery Since 1828

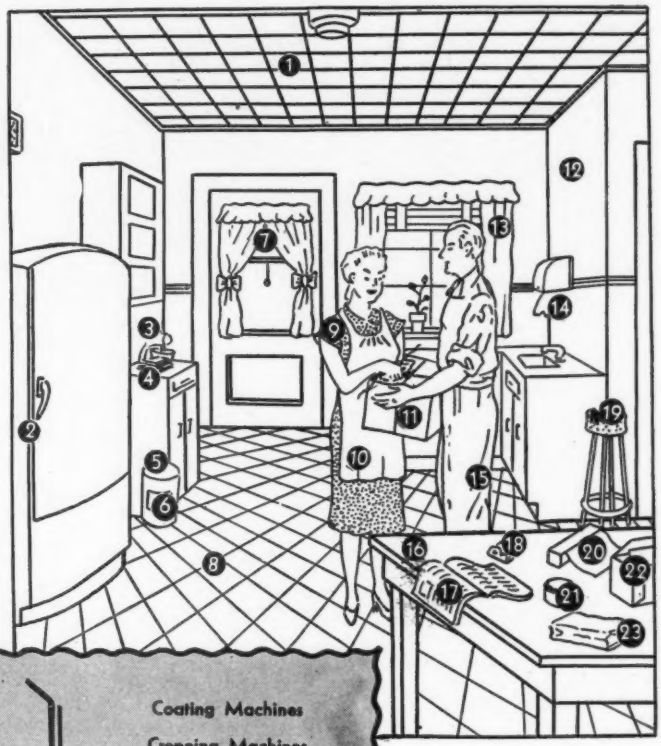
TRIMMERS • TUBERS • BOTTOMERS • SPOT CUTTERS • JORDANS •
FOURDRINIERS • SHOWER PIPES • PUMPS • CONTROL DEVICES

What next will be made

with the aid of

WALDRON MACHINES

The 23 products of everyday use shown in this picture give some idea of how WALDRON Converting Machines make possible the manufacture of a steadily widening variety of saleable articles, What next? Maybe the new product you have in mind!



1. Asbestos Panels
2. Door Lining
3. Elec. Insulation
4. Embossed Napkins
5. Fibre Board
6. Labels
7. Shade Cloth
8. Floor Covering
9. Printed Cloth
10. Rubberized Fabric
11. Decorative Paper
12. Plywood
13. Plastics Treated Paper or Cloth
14. Paper Towels
15. Men's Suiting
16. Plastics Table Tops
17. Coated Paper
18. Sealing Tape
19. Artificial Leather
20. Waxed Paper
21. Closures
22. Cartons
23. Bag Linings

Coating Machines
Creping Machines
Embossing Machines
Floor Cover Machines
Gumming Machines
Laminating Machines
Printing Machines
Rubber Mill Machines
Saturating Machines
Wall Paper Machines
Waxing Machines
Winders and Slitters
Special Design Machines

Here's how WALDRON can help you!

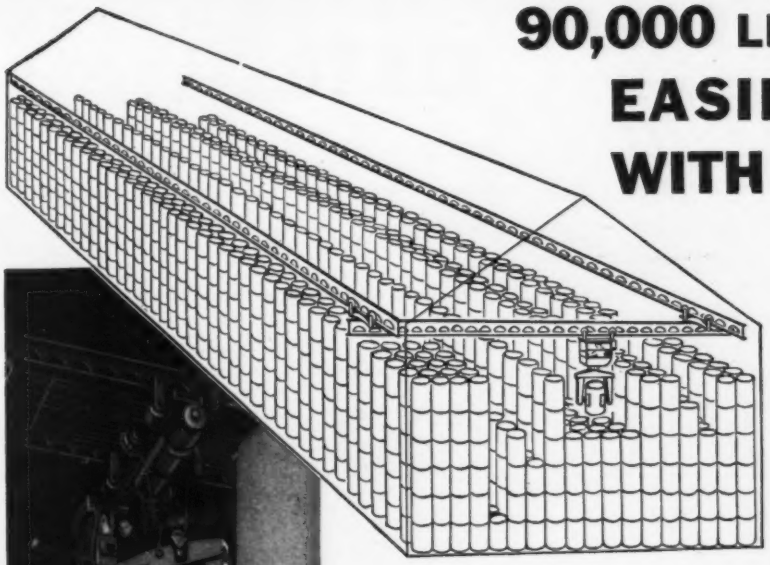
The wealth of knowledge and experience possessed by our Research and Engineering Staffs, plus the facilities of our experimental laboratory can help solve your development and processing problems. Why not consult us—in confidence of course.

JOHN WALDRON CORP.

Main Office & Works – NEW BRUNSWICK, NEW JERSEY

BUILDERS OF QUALITY MACHINES SINCE 1827

90,000 LBS. PER HOUR EASILY HANDLED WITH THIS SYSTEM



Rolls piled 6 or 7 high (42 feet or more). Entire floor area utilized. Aisle space eliminated.

MOTORIZED GRAB REVOLUTIONIZES ROLL HANDLING

NOT only can more tonnage be handled per hour, but one man, alone, working in the carrier cab can usually take care of all roll movements in a large storage room.

The motorized grab picks up or sets in place rolls weighing up to 6000 lbs.—even if nestled deep down completely surrounded by towering piles. The grab turns rolls to any position, vertical or horizontal.

The Cleveland Tramrail system handles materials of all grades and thicknesses speedily. It increases storage capacity 50% to 150% and cuts spoilage drastically.

GET THIS BOOK!

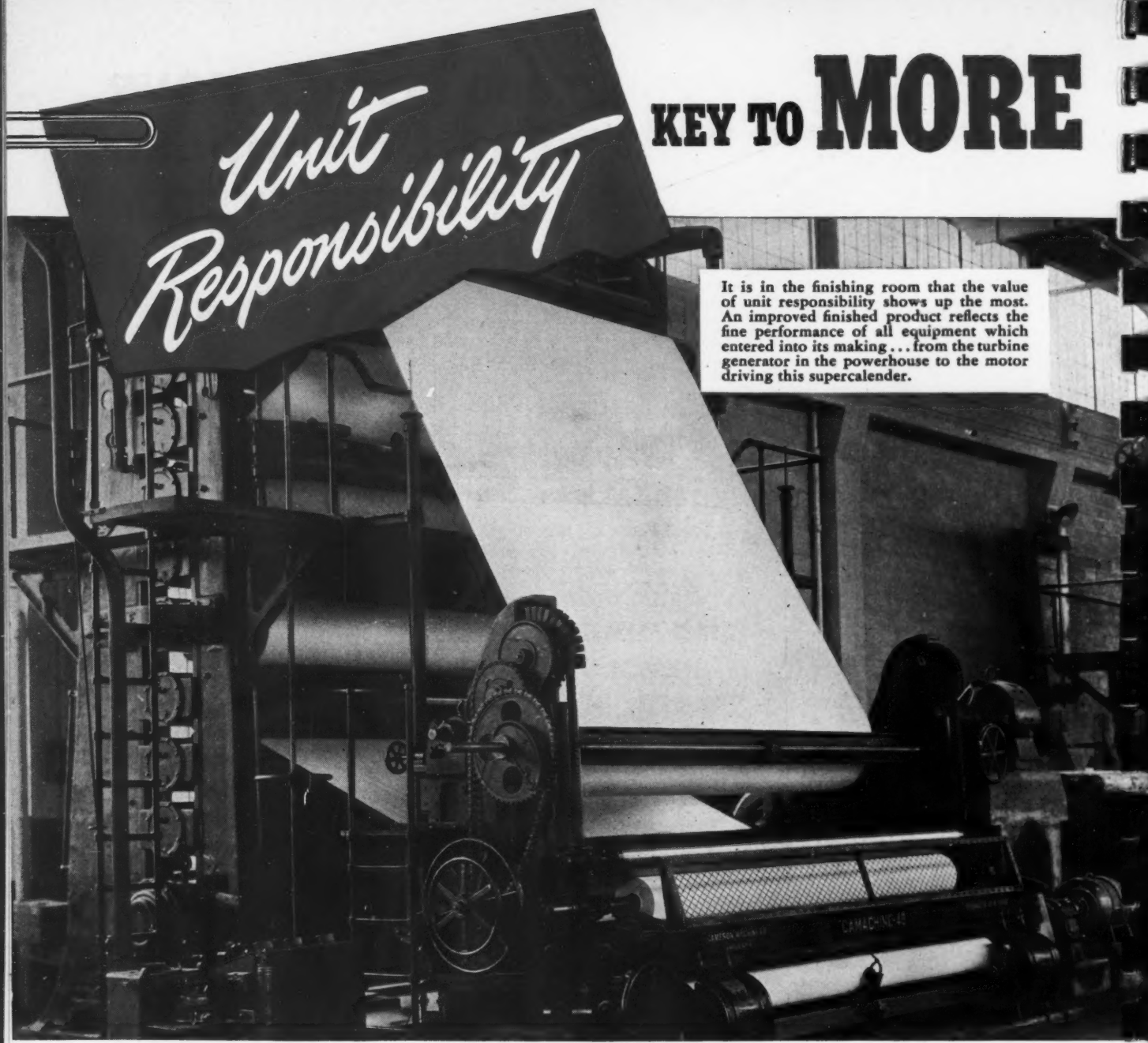
BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
7612 East 287th St. Wickliffe, Ohio

CLEVELAND TRAMRAIL

OVERHEAD MATERIALS HANDLING EQUIPMENT

KEY TO MORE



It is in the finishing room that the value of unit responsibility shows up the most. An improved finished product reflects the fine performance of all equipment which entered into its making . . . from the turbine generator in the powerhouse to the motor driving this supercalender.

POWER FOR PAPER-MAKING . . .
PRODUCED . . . PROTECTED . . . DELIVERED . . . *DEPENDABLY!*

Steam—and how it is used for heat and power—is a big factor in pulp and paper mill costs and in quality of output.

Westinghouse experience offers important benefits to pulp and paper mill operators in this direction. As a result of more than fifty years of experience in equipping power plants of all types, Westinghouse can carry full responsibility from selection of proper stokers and turbine generators in the powerhouse, to motors and steam auxiliaries in the finishing room.

Westinghouse "know-how" can be counted on both for dependable operation and for proper heat balance between process steam and steam for power.

Process efficiency and product quality start in the powerhouse. Westinghouse Paper Industry Engineers are ready to help you today. For details, call your local Westinghouse office or write to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-94758

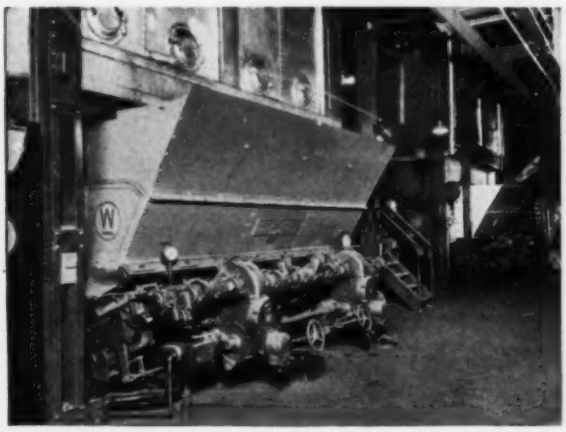
PRODUCTIVE POWER

"WESTINGHOUSE-EQUIPPED THROUGHOUT" MEANS SIMPLIFIED ORDERING, QUICKER INSTALLATION, MORE EFFICIENT OPERATION

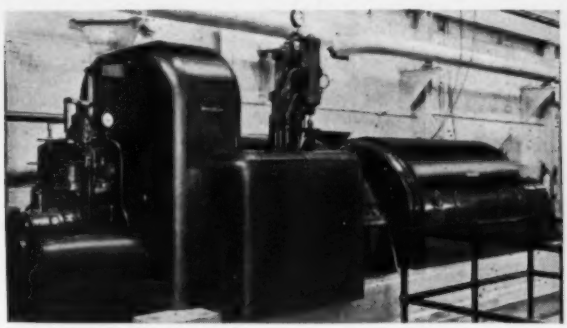
Putting power to work *productively* can be a major problem—or a simple one. When items must be selected, ordered and received from many sources, it means many chances for costly errors and delays . . . divided responsibility—or none at all—for performance of installed equipment.

Westinghouse offers the way to simplify the job. From equipment for generation of electrical or steam power, to the most specialized types of drives and control for its utilization, Westinghouse provides a single source of supply . . . one broad pair of shoulders competent to take responsibility for performance of all parts of the job.

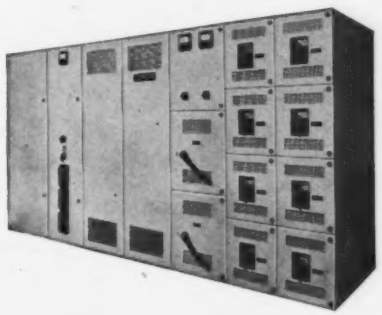
Here are a few of the places where Westinghouse unit responsibility prevents headaches . . . saves money . . . assures *more productive* power:



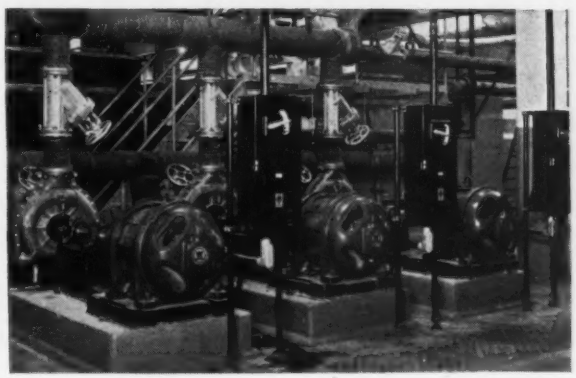
STOKERS—Ability to burn cheaper grades of fuel and to eliminate smoke nuisance are two outstanding advantages of Westinghouse "Link-Grate" Stokers. These stokers fire the boilers supplying power and process steam in a New York paper mill.



TURBINES—Constant process steam pressure and constant speed are maintained by this modern, 3,000-kw double bleeder turbine in a Wisconsin paper mill. In addition to turbines, Westinghouse supplies condensers in three types and a complete line of auxiliaries including condensate pumps, feed-water heaters, circulating pumps and steam jet air ejectors.



SWITCHGEAR—Westinghouse supplies a complete range of "Unitized" metal-clad switchgear that permits quick, economical installation. Unit shown contains a 750-kva, air-cooled transformer, high-voltage, metal-clad air circuit breaker, and draw-out, low-voltage air circuit breakers.



AUXILIARIES—Boiler room auxiliaries driven by Westinghouse motors and control assure continuity of service and give the desired flexibility of operation. Other miscellaneous equipment includes instruments, disconnecting switches, fuses and other electrical products that contribute to more efficient operation.

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

MORE PRODUCTIVE POWER FOR INDUSTRY

Our service simplifies

your paper work!

When you have paper production problems
remember that STEIN-HALL—
with its years of "know how"—
is eager to be of assistance.

Our salesmen...
more than just selling quality starches,
dextrines and gums...
are technical experts
...versed in applying these products
in actual use.

And those questions which
our salesmen cannot answer...
we will turn over to our fully staffed laboratory,
which is also at your beck and call.

At any time...
your nearest STEIN-HALL man
can be counted on for
prompt, thorough attention.

STARCHES, DEXTRINES AND GUMS
for the Paper Industry
LABORATORY-CONTROLLED FOR QUALITY
AND UNIFORMITY

STEIN SH HALL

285 MADISON AVENUE NEW YORK 17, N. Y.

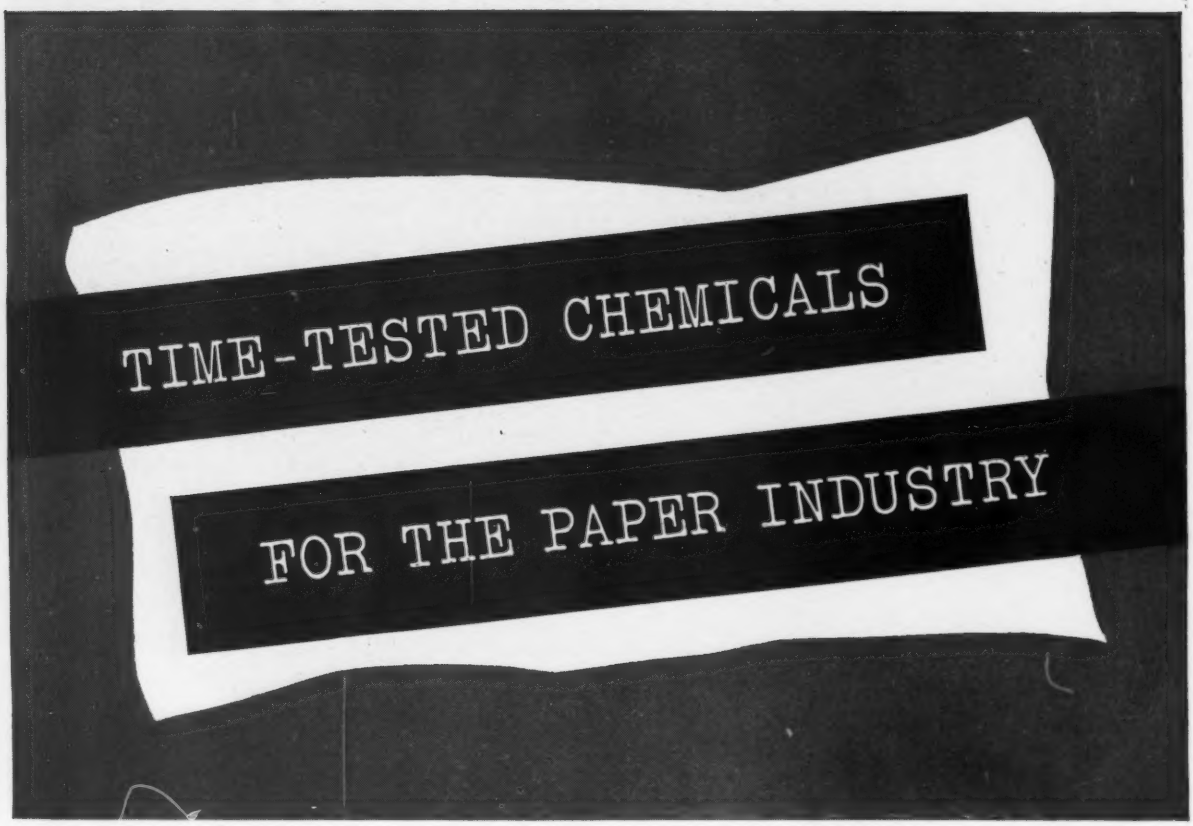
"PIONEERS" in the manufacture of CHILLED IRON ROLLS

1836...1948

It was early in the 70's that Lobdell started the casting of Chilled Iron Rolls. J. Morton Poole and other paper making machinery manufacturers were their first customers. As the superior qualities of Lobdell Rolls became known and the demand for them increased, the department expanded. Calender frames and accessories, special lathes and grinding machines for finishing the rolls, and roll calipers for the accurate measurement of roll diameters were added to the line.

Today, with nearly 75 years of experience in making rolls, complemented by modern design, modern facilities and new and better tools, Lobdell continues to serve the industry. Write for detailed information.

LOBDELL COMPANY, WILMINGTON 99, DEL.



HYDROSULFITES

Zinc hydrosulfite—fast, economical bleaching agent for groundwood.

Sodium hydrosulfite—effective color stripping agent for waste paper and rags.

TAMOL P

Economical, efficient aid for pitch control; dispersion of carbon black, calcium carbonate, and other pigments and fillers; precipitation of glue size.

RHOZYMES

Pioneer starch-converting enzymes for preparation of sizing, coatings and adhesives. Stable, dry form.

TRITONS

Diversified series of wetting agents improving absorbency; cooking of rag stock and waste paper; softening, dispersion or emulsification of surface treatments; felt washing. Anionic, cationic and non-ionic types.

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Manufacturers of Chemicals including Plastics • Synthetic Insecticides • Fungicides • Germicides
Chemicals for the Leather, Textile, Ceramic, Rubber, Petroleum and other Industries

st IN ENGINEERING FOR PULP PRODUCTION

SWENSON *first* adapted Long Tube Vertical Evaporators to black liquor.
SWENSON *first* developed the annular steam baffle.
SWENSON *first* used the liquor deflector.
SWENSON *first* developed a double body first effect.
SWENSON was *first* to feed the last two bodies in parallel.
SWENSON was *first* to design and use internal catch-alls.
SWENSON was *first* with a practical design for a successive multi-stage condensate flash system.
SWENSON was *first* with a practical design for a thick liquor flash system.
SWENSON was *first* with 5-body quintuple effect evaporation.
SWENSON was *first* with 6-body quintuple effect evaporation.
SWENSON was *first* with sextuple effect evaporation.
SWENSON was *first* with septuple effect evaporation.
SWENSON was *first* with the 2-pass heating element.
SWENSON was *first* with chromium plated tubes in heating elements and surface condensers.
SWENSON *first* employed longer and longer tubes.
SWENSON was *first* to recommend the use of the sodium bisulfate method of removing calcium aluminum silicate scale.
SWENSON was *first* to suggest the use of the white liquor method of removing fouling from the vapor side of the tubes.
SWENSON *first* provided for circulating white liquor for cleaning.
SWENSON is the *first* and *only* evaporator manufacturer to publish technical information for the benefit of the pulp mill industry.

This remarkable record of achievement demonstrates how Swenson customers have been first to enjoy the benefits of successive engineering advances in equipment for black liquor evaporation.

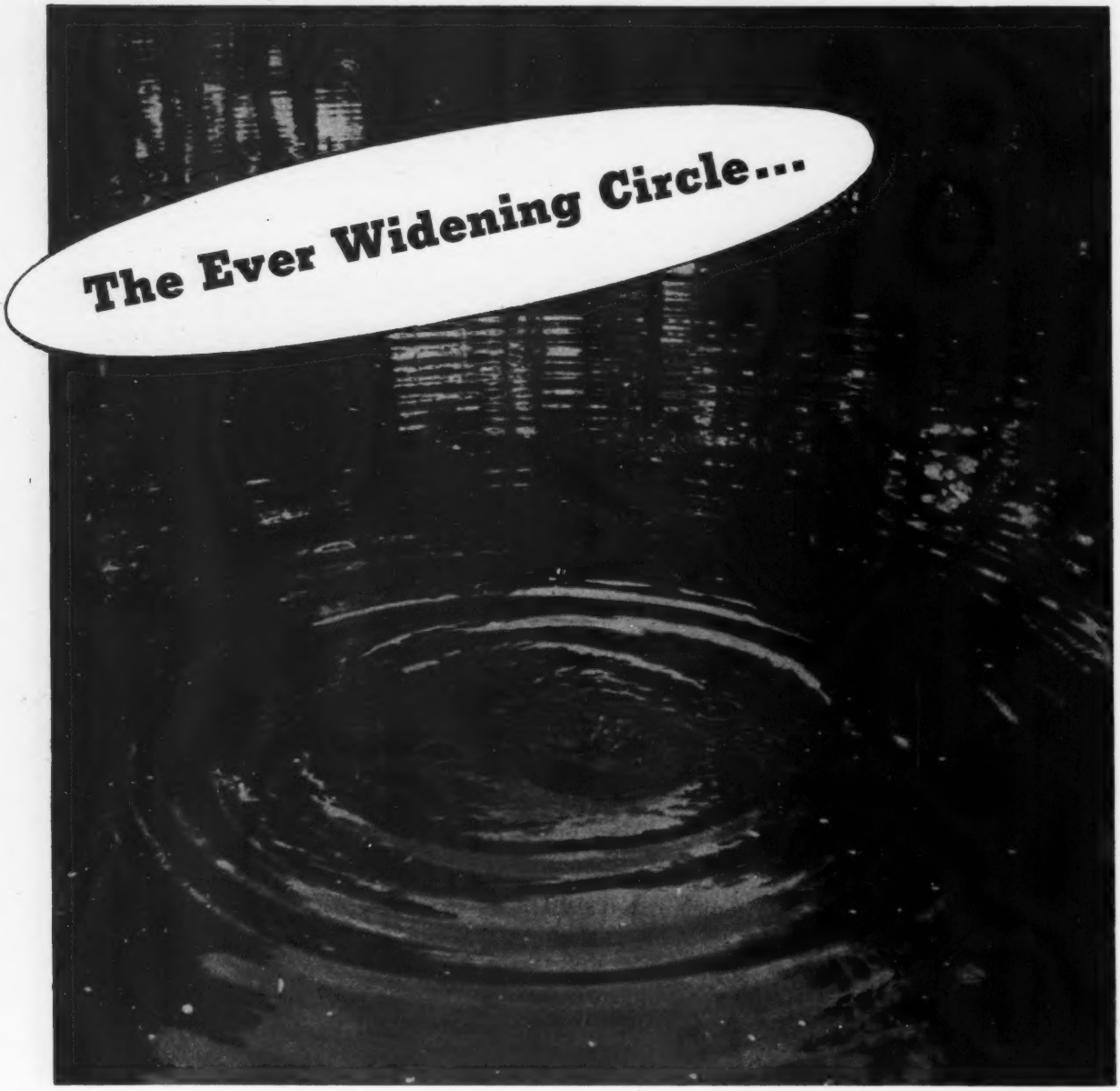
Many Swenson developments in evaporation and filtration are so widely accepted in the pulp and paper industry that frequent attempts are made to imitate them. Very seldom, however, have these imitations succeeded in rivalling the operating efficiency and economy of the Swenson-engineered originals.

Swenson is still pioneering. The ultimate in process development has not yet been achieved. It probably never will be. But you can secure the benefits of the latest research and technological progress by making Swenson your source of equipment. Swenson has supplied well over 60% of all the black liquor evaporation capacity sold during the last two years.

SWENSON

SWENSON EVAPORATOR COMPANY

Division of Whiting Corporation
15687 Lathrop Avenue, Harvey, Ill.
Eastern Sales Office and Export Department:
30 Church St., New York 7, N. Y.



. . . of enthusiastic users of Rayco Linter Cotton has increased steadily in the few short years since it was first introduced by Railway Supply as a highly satisfactory furnish for paper making.

News of the success of Rayco Linter Cotton as a base material in the manufacture of fine cotton content papers spread from mill to mill. Experience has shown it is always delivered clean, ready for the cooker, and speeds production by eliminating rag room operations and reducing cooking time.

Get in touch with us and arrange for a Rayco engineer to give you an in-the-mill demonstration—prove to you Rayco Linter Cotton is easily adaptable to your own process, equipment and product.

THE RAILWAY SUPPLY & MFG. CO. and Affiliates

Specialists in Grading, Marketing and Processing Cotton Fibers

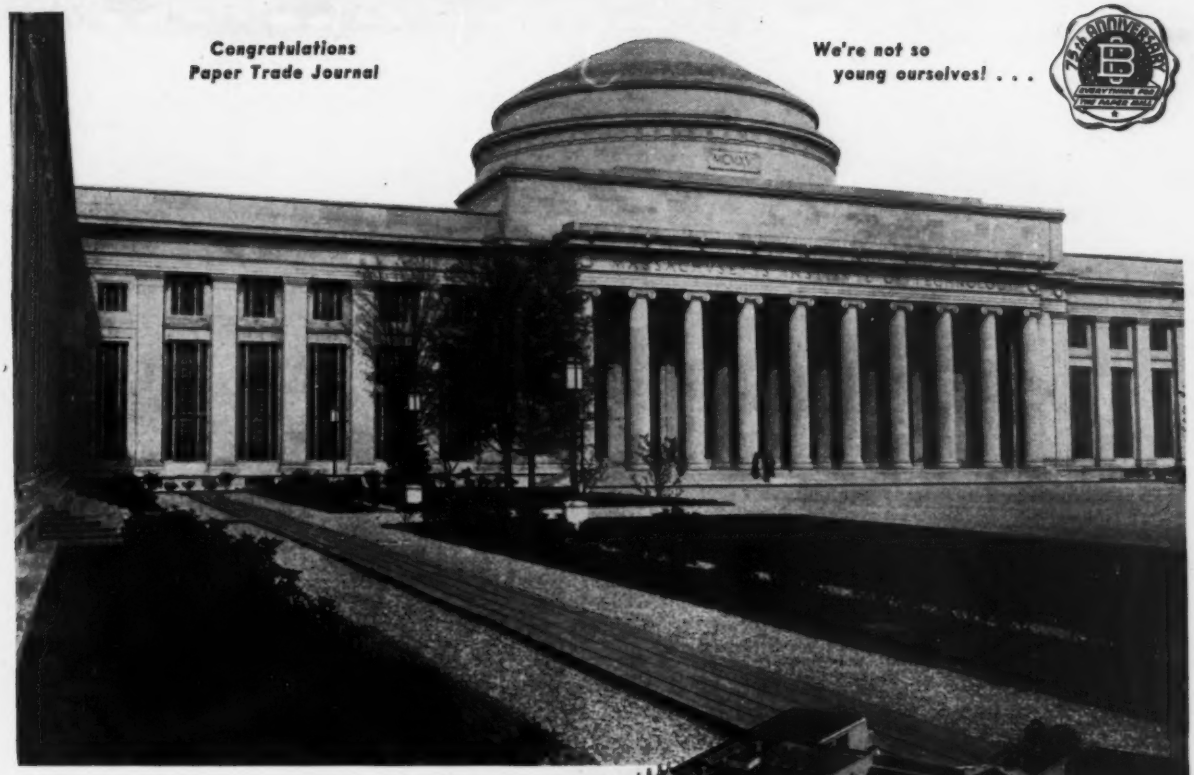
General Offices: CINCINNATI, OHIO

NEW YORK . . . CHICAGO . . . MEMPHIS . . . DALLAS . . . DETROIT . . . ATLANTA . . . CHARLOTTE

RAYCO LINTER COTTON

Congratulations
Paper Trade Journal

We're not so
young ourselves! . . .



MASSACHUSETTS INSTITUTE OF TECHNOLOGY

BLACK-CLAWSON
HAMILTON, OHIO

EVERYTHING
THE LAW REQUIRES

From A to Z—everything for the engineer—at our top ranking engineering schools. From Alpha to Omega—"everything for the paper mill"—at Black-Clawson, Shartle, Dilts.

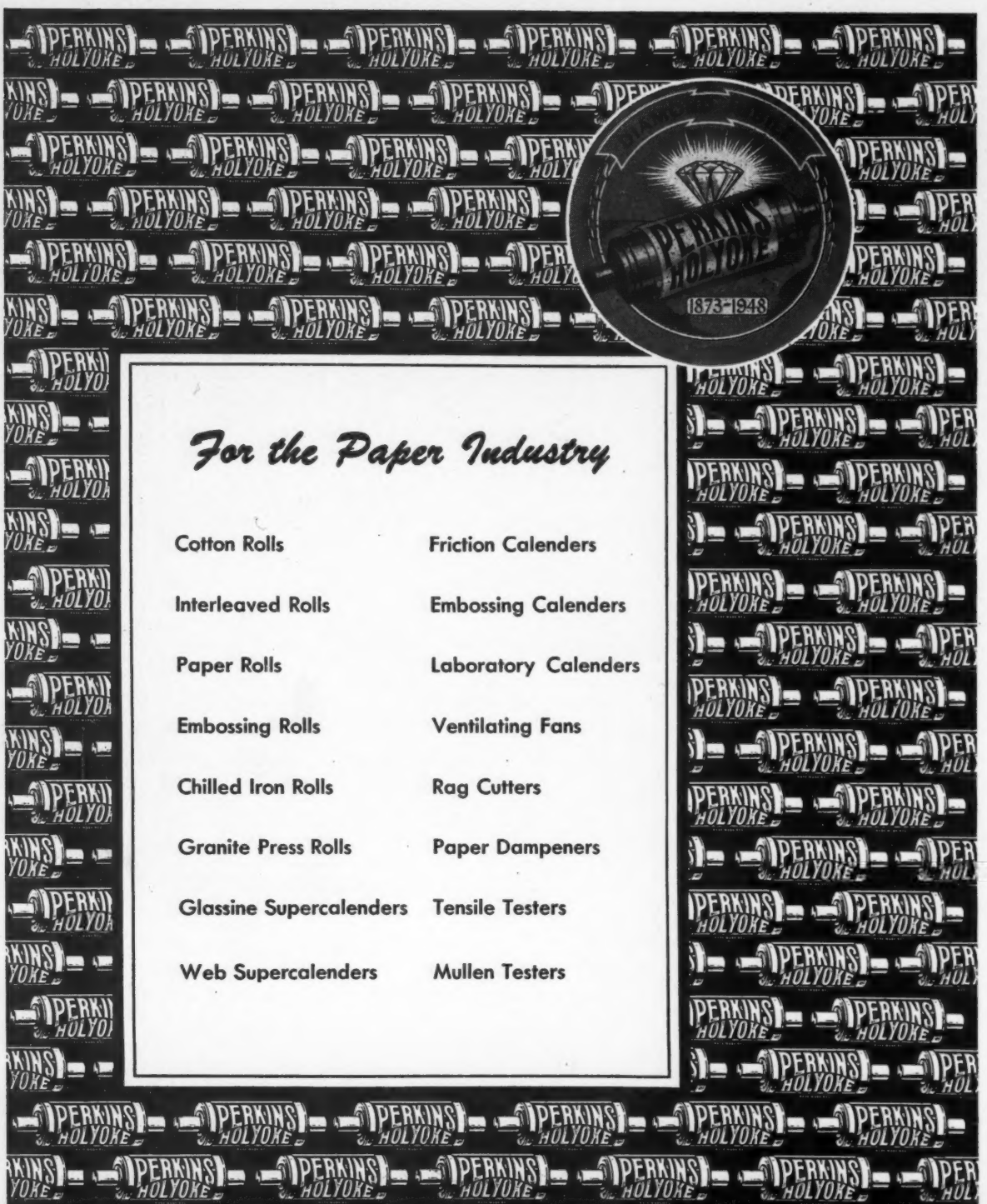
If it's preparatory equipment, take it up with Shartle or Dilts. If it's paper machines, drives, and finishing equipment, contact Black-Clawson at Hamilton. If it's converting machines, look to Dilts.

For experienced advice on paper making techniques, look to all three divisions. Their long association with the mills and broad experience in mill equipment engineering should stand you in good stead.

The Black-Clawson Co.

Hamilton, Ohio

DIVISIONS SHARTLE BROS. MACHINE CO., MIDDLETOWN, OHIO
DILTS MACHINE WORKS, FULTON, NEW YORK
ASSOCIATE: ALEXANDER FLECK LIMITED, OTTAWA, CANADA



For the Paper Industry

Cotton Rolls	Friction Calenders
Interleaved Rolls	Embossing Calenders
Paper Rolls	Laboratory Calenders
Embossing Rolls	Ventilating Fans
Chilled Iron Rolls	Rag Cutters
Granite Press Rolls	Paper Dampeners
Glassine Supercalenders	Tensile Testers
Web Supercalenders	Mullen Testers

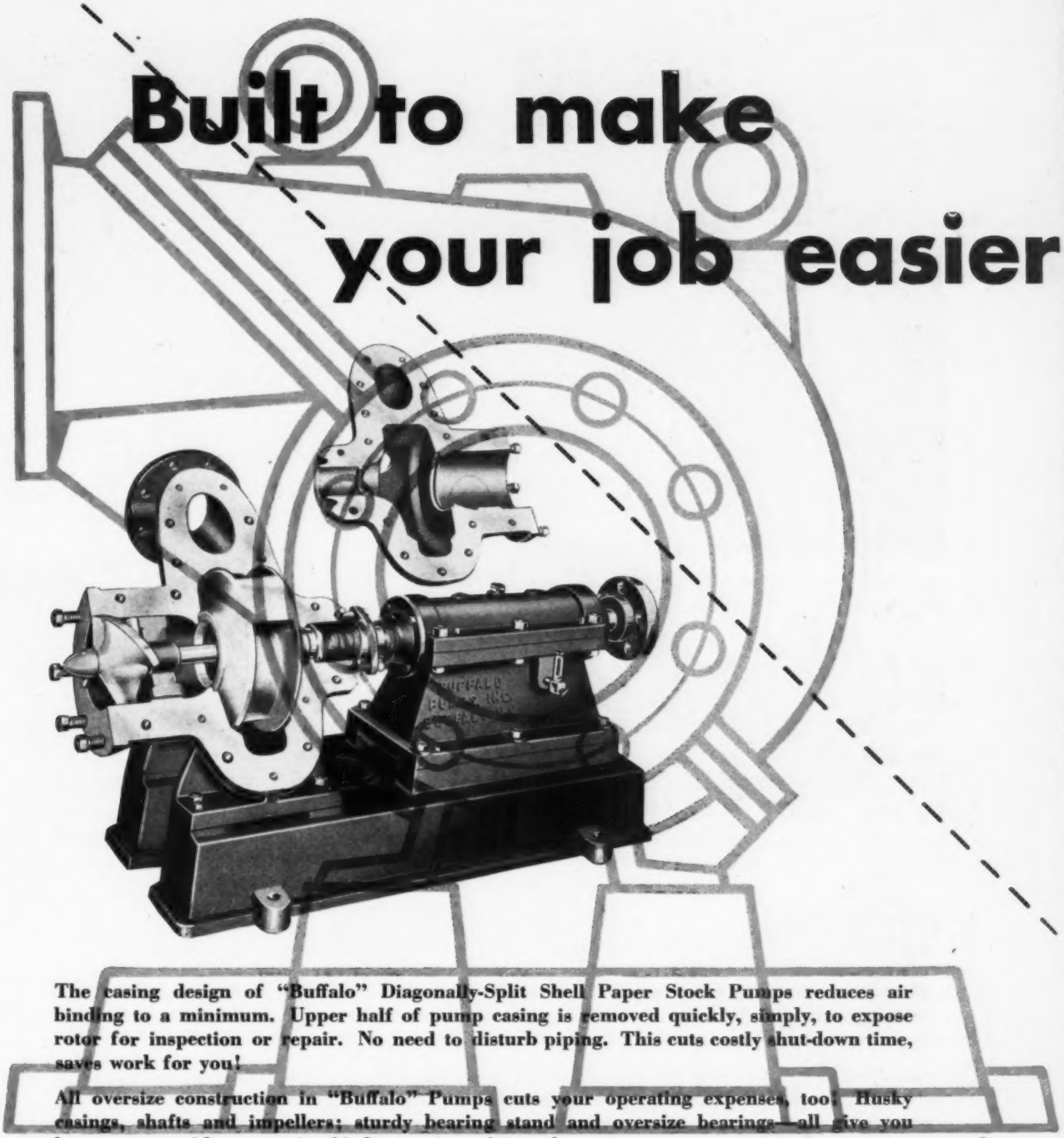
B. F. PERKINS & SON, Inc.

ENGINEERS AND MANUFACTURERS

HOLYOKE, MASS.

LARGEST MANUFACTURERS OF CALENDER ROLLS IN THE WORLD

Built to make your job easier



The casing design of "Buffalo" Diagonally-Split Shell Paper Stock Pumps reduces air binding to a minimum. Upper half of pump casing is removed quickly, simply, to expose rotor for inspection or repair. No need to disturb piping. This cuts costly shut-down time, saves work for you!

All oversize construction in "Buffalo" Pumps cuts your operating expenses, too! Husky casings, shafts and impellers; sturdy bearing stand and oversize bearings—all give you longer wear without repair, further saving of time for you.

- Write today for details on "DS" Pumps and other Buffalo Pumps for Paper Mill Service.

BUFFALO PUMPS, INC.

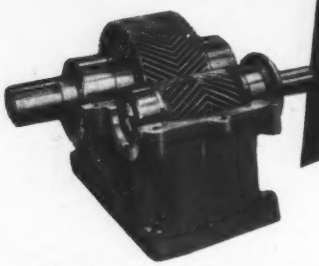
159 MORTIMER STREET, BUFFALO, NEW YORK
Canada Pumps, Ltd., Kitchener, Ont.
Branch Offices in all Principal Cities

"Buffalo"

DIAGONALLY-SPLIT
PAPER STOCK PUMPS

The photograph shows five digester drives recently built by Western Gear Works for one of the large pulp and paper manufacturers.

★ *GEARS for every need*

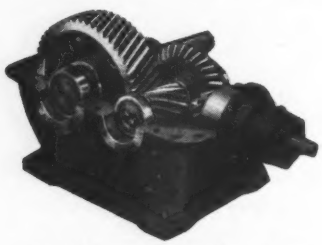


SPECIFY

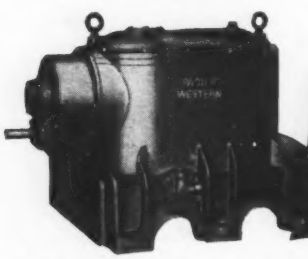
PACIFIC-WESTERN GEARED DRIVES

for Reliable Service

★ *Single-reduction speed reducer*



★ *Right-angle speed reducer*



Many Popular Types and Sizes of Speed Reducers Available from Stock

★ *Vertical speed reducer*

The digester drives shown above are typical of the products and services available to the pulp and paper industry from Western Gear Works. The 15-hp motor drives a Pacific-Western D. T. 58 speed reducer of 97.66/1 ratio. The spur pinion on the reducer's output shaft in turn drives a 72½-inch-diameter gear enclosed by the mesh guard. This gear has a spur pinion on its output shaft which drives another Pacific-Western-made gear 9½ feet in diameter. This gear revolves the digester cylinder.

For more than half a century we have been solving the gear problems of the pulp and paper industry—quickly, efficiently, and economically. A complete line of power-transmission equipment, developed by men whose lives have been devoted to this work, is available to serve your needs. Let us show you how we can put this experience and ability to work to save you time and money.

Write, wire or phone nearest plant or office for complete information.

WESTERN GEAR WORKS, Seattle 4, Washington
WESTERN GEAR WORKS, Box 192, Lynwood, California
PACIFIC GEAR & TOOL WORKS, San Francisco 3, California
SALES REPRESENTATIVES: Portland . . . Salt Lake City

AGMA MEMBER

PACIFIC GEAR & TOOL WORKS ⚙ WESTERN GEAR WORKS

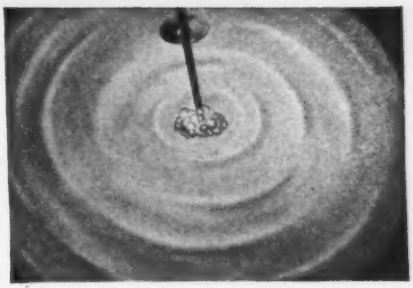
PACIFIC-WESTERN

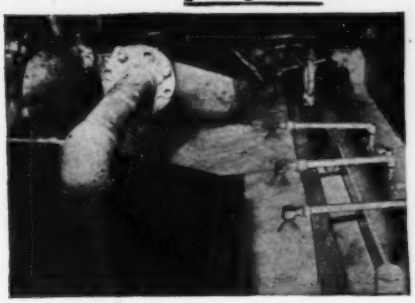
487

GEAR PRODUCTS

STATISTICS THAT LOOK GOOD "on paper"

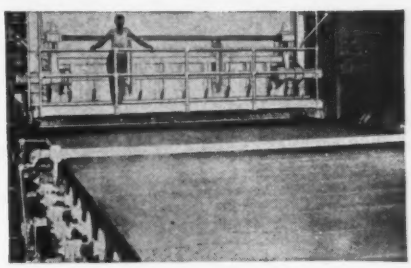
1 Minute... *that's all it takes to prepare the NOPCO KF* emulsion*

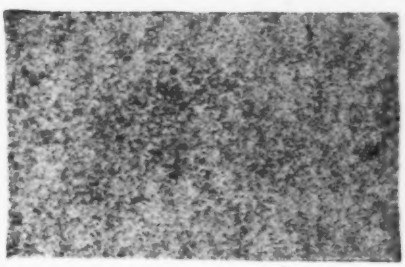




2 Minutes... *that's how fast NOPCO KF drives foam from the head-box*

5 Minutes... *that's all NOPCO KF needs to clear bubbles from the wire*





75%... *NOPCO KF assures 75% or greater elimination of thin spots*

NOPCO KF super "bubble-buster" improves sheet formation even at increased machine speeds by its better fiber dispersion and foam control. Entrained air — common cause of thin spots—is dissipated as if stock were being handled at slow speeds—because NOPCO KF *keeps working* on the wire.

More paper produced with fewer cleanups necessary . . . breaks reduced . . . surface characteristics improved . . . valuable paper-making material conserved . . . water repellency materially increased . . . these further advantages of NOPCO KF also look good — because they *make good* — *on paper*.

See what this chemical substance—expressly formulated to aid sheet formation—can do in your mill. Order enough for a trial run.

*Reg. U. S. Pat. Off.

NOPCO CHEMICAL COMPANY
Formerly National Oil Products Company

Boston • Chicago • HARRISON, N. J. • Cedartown, Ga. • Richmond, Calif.

AN AFFILIATE OF THE AMERICAN PULP AND PAPER MILL SUPERINTENDENTS ASSOCIATION

NOPCO KF
SUPER "BUBBLE-BUSTER"

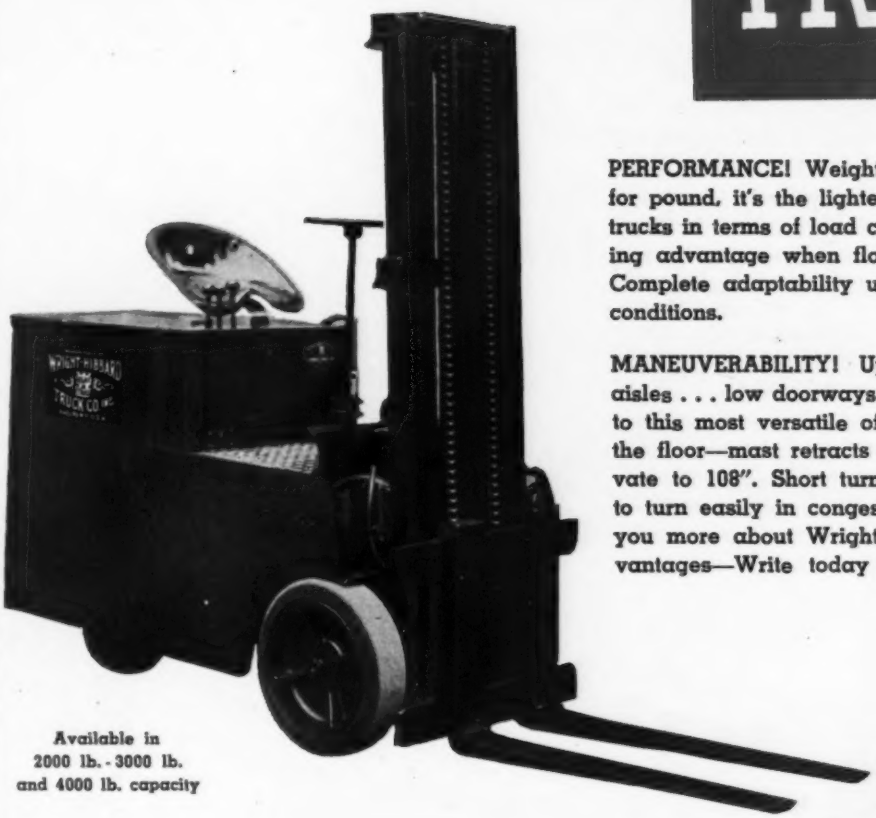
As one old-timer
to another
ORR FELT
extends to
PAPER TRADE JOURNAL
Congratulations
on their 75th birthday

THE ORR FELT & BLANKET CO., PIQUA, OHIO

Highest Quality Paper-making Felts

WRIGHT for the RIGHT JOB!

RIGHT TRUCK



Available in
2000 lb. - 3000 lb.
and 4000 lb. capacity

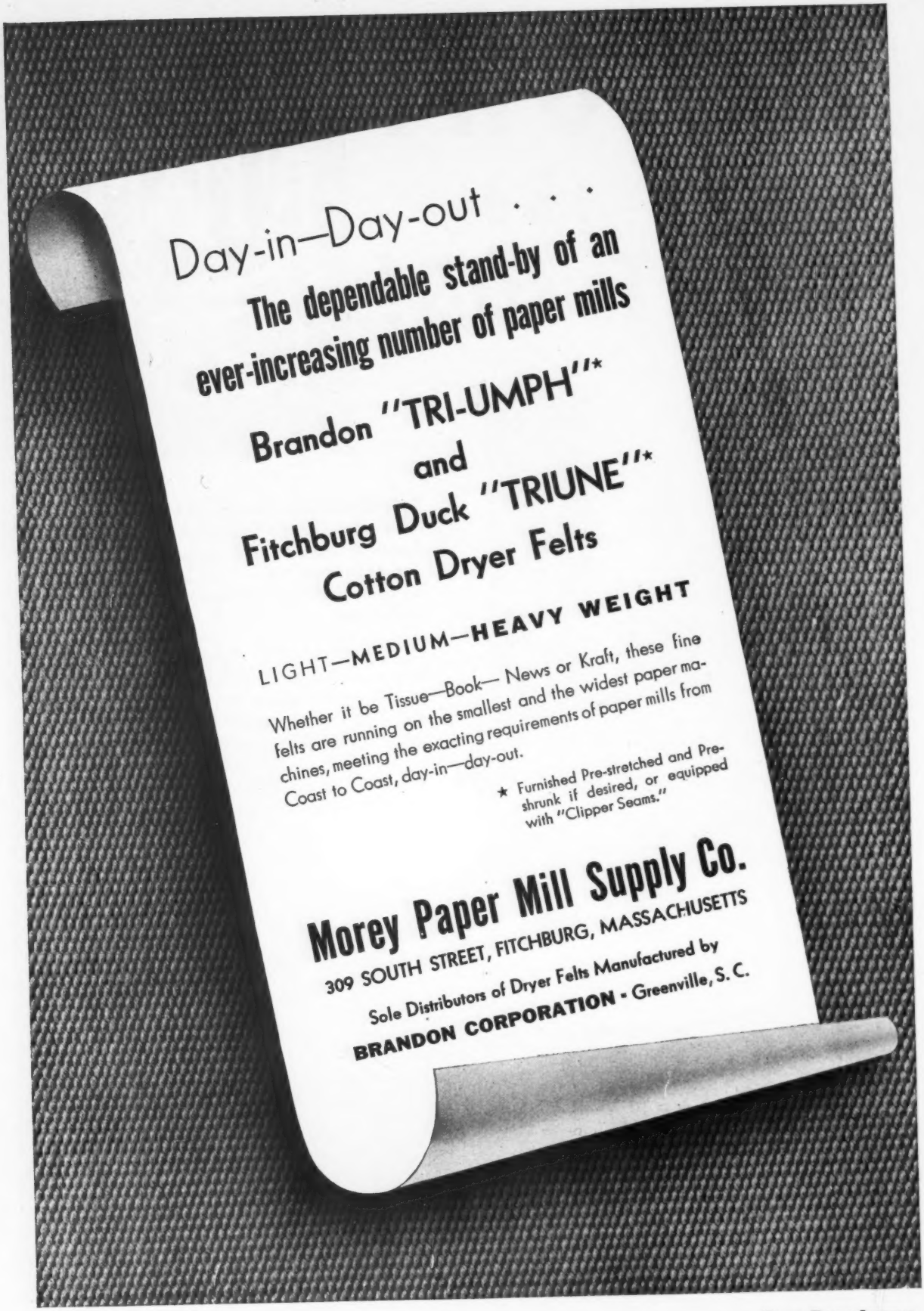
PERFORMANCE! Weight for weight . . . pound for pound, it's the lightest of all electric fork trucks in terms of load capacity. An outstanding advantage when floor loads are limited. Complete adaptability under the most trying conditions.

MANEUVERABILITY! Up-grades . . . narrow aisles . . . low doorways make little difference to this most versatile of fork trucks. It hugs the floor—mast retracts to 76" and forks elevate to 108". Short turning radius permits it to turn easily in congested areas. Let us tell you more about Wright Hibbard's many advantages—Write today for catalog No. 200.

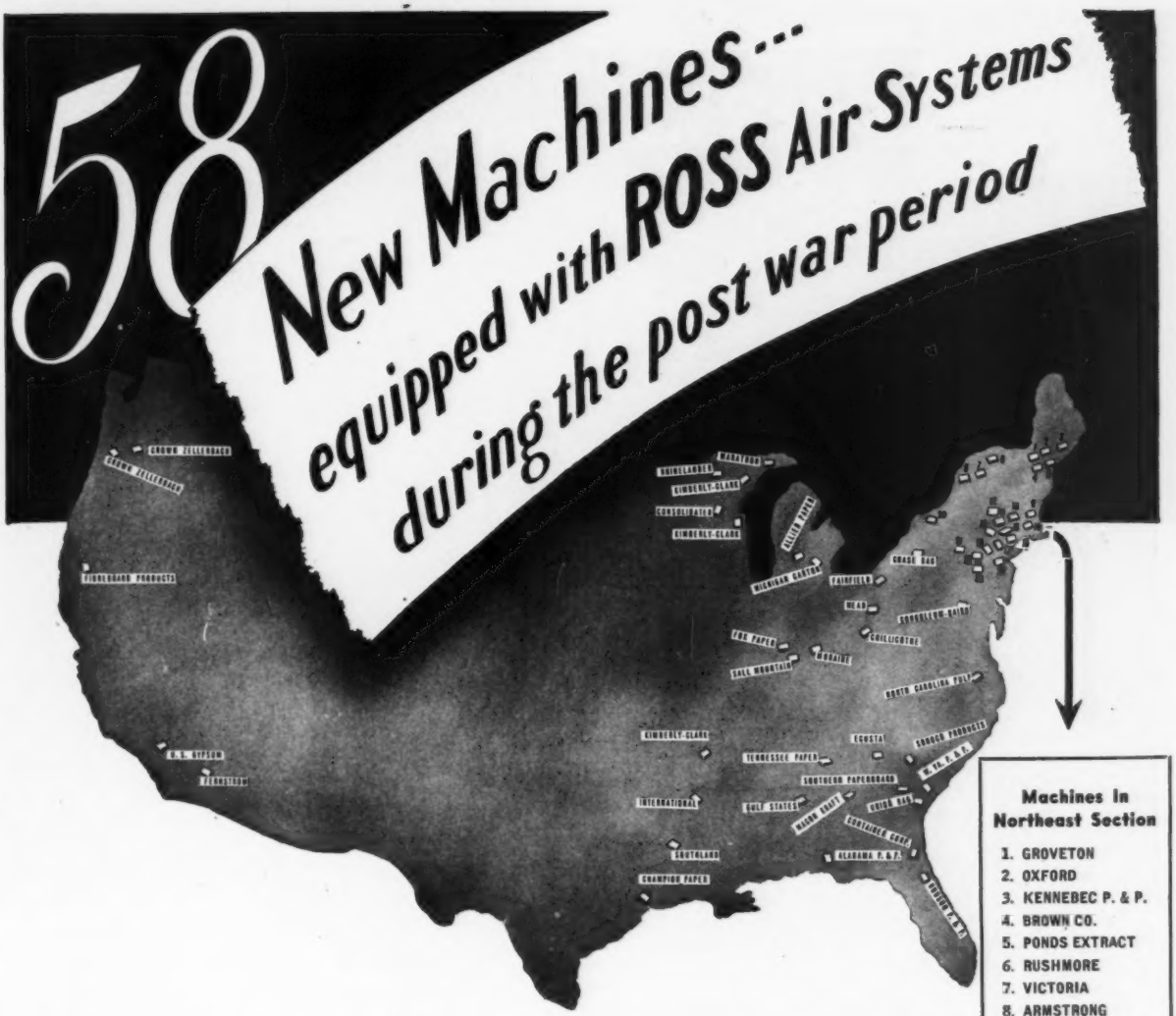
100 percent
TIMKEN BEARING EQUIPPED

MANUFACTURERS OF ELECTRIC INDUSTRIAL TRUCKS FOR 25 YEARS

WRIGHT HIBBARD
INDUSTRIAL ELECTRIC TRUCK CO., INC.
PHELPS, N. Y.


Day-in—Day-out . . .
The dependable stand-by of an ever-increasing number of paper mills
Brandon "TRI-UMPH"*
and
Fitchburg Duck "TRIUNE"*
Cotton Dryer Felts
LIGHT—MEDIUM—HEAVY WEIGHT
Whether it be Tissue—Book— News or Kraft, these fine felts are running on the smallest and the widest paper machines, meeting the exacting requirements of paper mills from Coast to Coast, day-in—day-out.
* Furnished Pre-stretched and Pre-shrunk if desired, or equipped with "Clipper Seams."
Morey Paper Mill Supply Co.
309 SOUTH STREET, FITCHBURG, MASSACHUSETTS
Sole Distributors of Dryer Felts Manufactured by
BRANDON CORPORATION - Greenville, S. C.

58 New Machines... equipped with ROSS Air Systems during the post war period



Machines in Northeast Section

1. GROVETON
2. OXFORD
3. KENNEBEC P. & P.
4. BROWN CO.
5. PONDS EXTRACT
6. RUSHMORE
7. VICTORIA
8. ARMSTRONG
9. CROCKER-BURBANK
10. GOLDEN FLEECE
11. GOTHAM
12. MARINETTE PAPER
13. A. P. W.
14. UNION BOX BOARD
15. SANITARY PAPER
16. ROBERT GAIR
17. TILO ROOFING
18. MARCALLUS
19. JOHNS-MANVILLE
20. HAMMERMILL
21. NATIONAL PAPER
22. U. S. GYPSUM
23. PERSONAL PRODUCTS

58 agree . . . on the problem and solution

Handling the enormous quantities of air required in the making of paper presents one of the major engineering problems that confront the industry. How this raw material—air—is supplied, applied and removed, has a distinct bearing on production and profit. That leading manufacturers understand the importance of the problem and agree on the most effective means of solving it is evidenced by the fact that practically all new machines installed since 1945 have been equipped with ROSS Air Systems. Handling air the right way is to handle it the ROSS way.

ROSS SYSTEMS

J. O. ROSS ENGINEERING CORPORATION

MANUFACTURERS OF AIR PROCESSING SYSTEMS

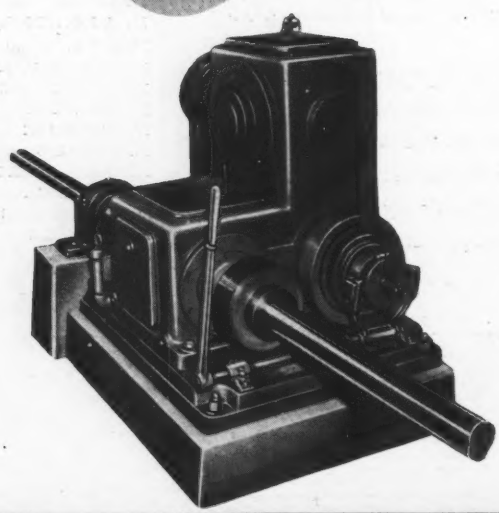
350 MADISON AVENUE NEW YORK 17, N. Y.

201 N. Wells Street, CHICAGO-6 • 79 Milk Street, BOSTON-9 • 9225 Grand River Avenue, DETROIT-4 • 1231 E. Seventh Street, LOS ANGELES-21

ROSS ENGINEERING OF CANADA, LIMITED, MONTREAL 19, CANADA • CARRIER-ROSS ENGINEERING COMPANY, LIMITED, LONDON, ENGLAND

For Increased Production...
For Constant Quality...

SPECIFY SYCO DRIVES



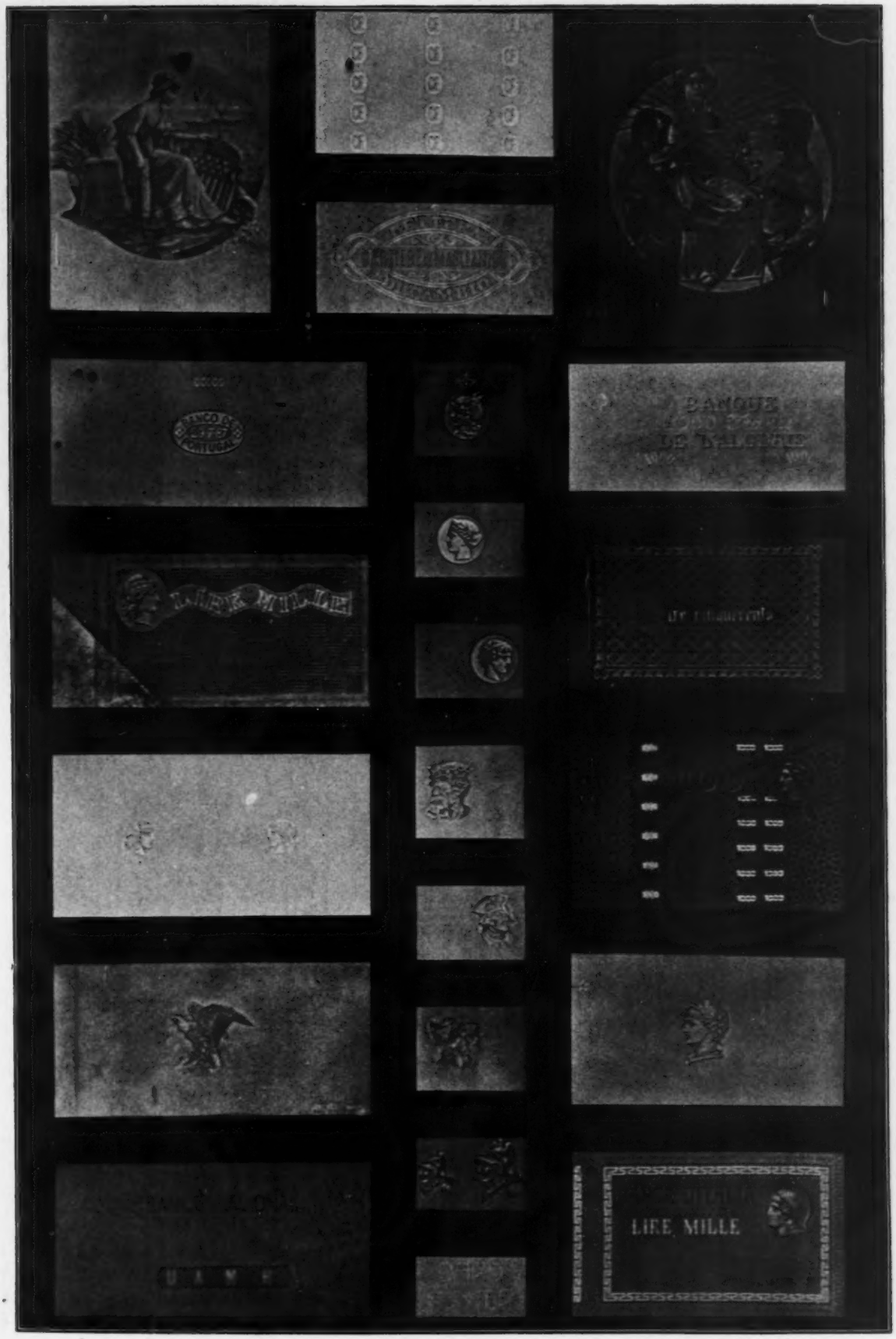
SYCO Drive Units provide the modern, mechanical variable speed drive for all sections of your paper machine—give speed control that turns out constant quality paper in *increased* production . . . require less labor, floor space, and power.

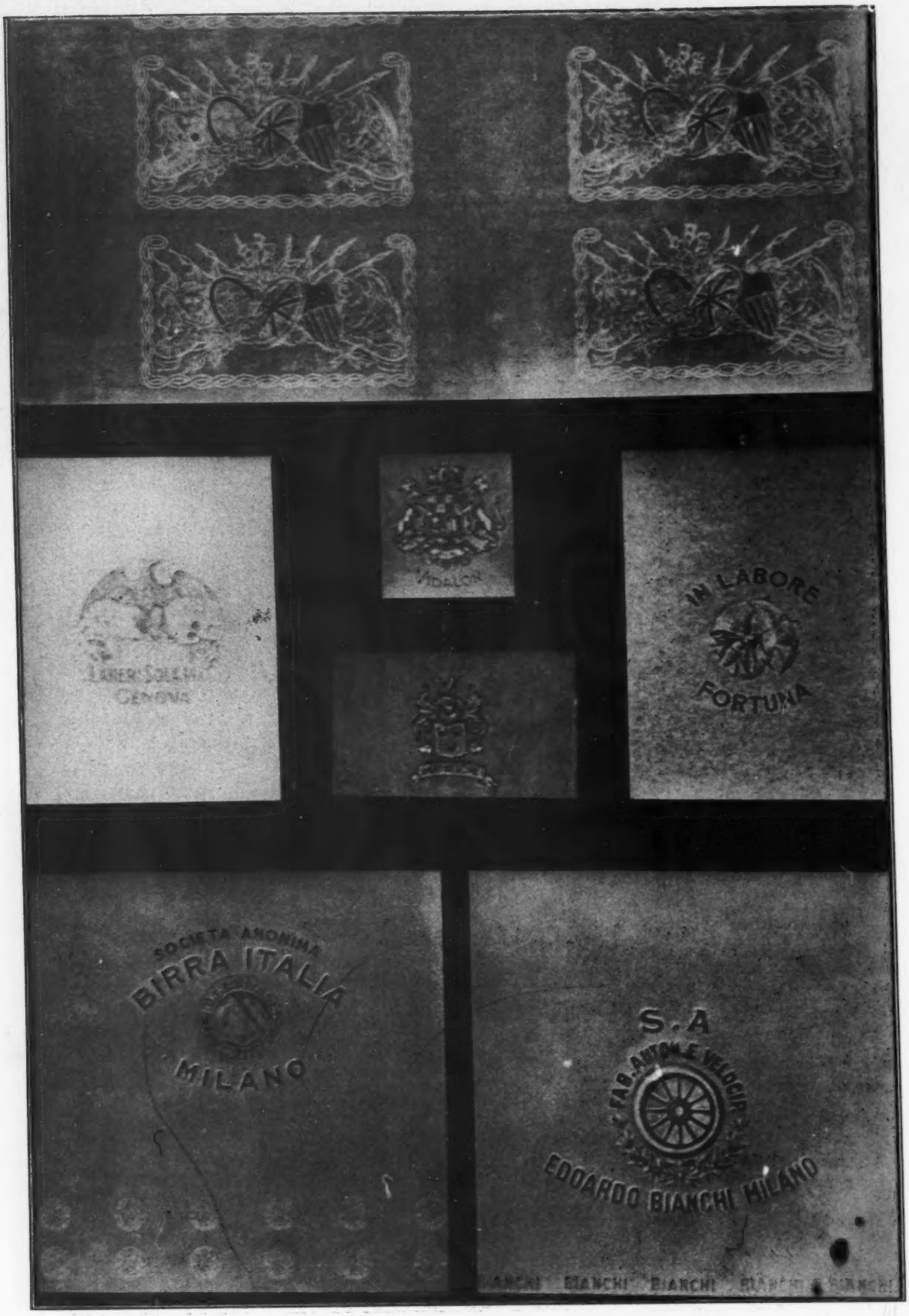
Better paper . . . more paper from present machine with precision-built SYCO Drives . . . rugged alloy shafts mounted in accurate anti-friction bearings . . . automatic full-flow lubrication . . . close alignment . . . these factors pay dividends in around-the-clock trouble-free operation.

For new machines, or machines now in service, SYCO Drives are available, easily installed, completely engineered to your exact requirements.

● Write us for full information on SYCO Drives—what they can do on your machine —present or proposed.

SYCO MANUFACTURING CORP., 324 West Fayette St., SYRACUSE, N.Y.


BANQUE
LIRE MILLE
LIRE MILLE


VIDALON
IN LABORE
FORTUNA
SOCIETA ANONIMA
BIRRA ITALIA
MILANO
S.A
FAB. AUTOM. E VELOCIP.
EDOARDO BIANCHI MILANO

Museum the unique position of being able to promote interest in the use of every type of paper. This opportunity would not be possible with individual papermaking firms, or with organizations directly connected with the American paper industry. The Paper Museum of M. I. T. is entirely free from advertising or publicity, and there will be no deviation from this policy. We are constantly being consulted regarding the proper paper for application to particular needs, and this information is furnished without charge or favor.

"The Paper Museum has furnished hundreds of photographis for use in histories, text books, encyclopedias, and childrens' literature. Collection of this material is most extensive, especially from all sections of Asia, where the art of papermaking had its beginning, and where lies the real history of this age old craft. All of the work done by the Museum is educational, and there is no possible means of deriving any revenue.

"For the most part, the exhibits in the Paper Museum relate to the history of paper and papermaking, and, inasmuch as the paper-machine is of comparatively modern conception, it is only natural that the assembled material is chiefly devoted to the making of paper by hand. The paper-machine was introduced into America as late as 1817, but the invention of paper dates from about the year 105. Therefore, the craft of papermaking was practiced almost 1700 years before the paper-machine was even contemplated or suggested.

"The three indispensable crafts, having their origin in ancient times, are weaving, ceramics, and papermaking—each holding equal interest for the antiquarian and historian. It is to be lamented that more paper mill officials and skilled papermakers do not endeavor a greater interest and understanding of the history of the craft to which their lives are devoted. Study of paper, throughout the ages, is of profound interest and fascination, and such a study should be a welcomed diversion from the constant thought of the widths of machines, feet per minute, and costs per ton.

"Although the Paper Museum is primarily concerned with the history of paper and papermaking, it is apparent that a miniature paper-machine would be of decided help in explaining the making of modern paper to the many school and college groups that visit the exhibition hall. It is our desire to install a workable paper-machine, capable of forming paper somewhat less than twelve inches in width. Such a machine would enable us to explain present-day methods of making paper in a continous web, and compare this fast production method with the slow process of forming each sheet separately upon hand-moulds.

"Heretofore, the Paper Museum has been sponsored and financed by the Massachusetts Institute of Technology, and that educational institution that has nothing to gain by promoting the paper industry. The paper mills of America have not been asked to make any contribution whatever to the Paper Museum, and all the expense, now nearing $100,000, has been undertaken by the Institute and by the Curator of the Museum.

"For almost ten years the paper industry of the United States has enjoyed the prestige and educational advantages afforded by the Paper Museum. It would now seem appropriate and fitting for the entire paper industry to come foreward and finance the acquisition of a working model paper-machine, so the Paper Museum could enlarge upon the educational work it is doing, and hopes to do in the future.

"A miniature beater, stuff-chest, paper-machine, and all essential appurtences for operation, can be built for approximately $15,000. This sum could be apportioned over the industry, each company assuming its proportion of the amount, and each donor receiving due credit for the installation of this educational equipment.

"The Curator of the Paper Museum will welcome suggestions, and all communications should be sent to Dr. Dard Hunter, Paper Museum of the Massachusetts Institute of Technology, Cambridge 39, Massachusetts."

(—Picture, Opposite Page)

(Courtesy, Dard Hunter Paper Museum, Massachusetts Institute of Technology)

Protective Watermarking

Light-and-shade watermarked paper made in England, France and Italy. Watermarking of this kind is used for bonds, money and official documents, where counterfeiting must be avoided.

CHAPTER XXIX

Organization of American Paper and Pulp Association

THE Writing Paper Manufacturers Association, believed to be the oldest trade association in the United States, held its first meeting at Pittsfield, Massachusetts, in 1860. Intention of the meeting was to cooperate in curtailing production, in order to increase prices. Production to be cut was less than fifty tons a day. Their purpose was not accomplished, but the outbreak of the Civil War, by increasing the demand to equal the supply, brought about the desired result.

With the cessation of hostilities the old problem again rose. During the period 1865 and 1878 there were two other loosely knit associations, but the plans formulated at their meetings seem never to have been successfully carried out, and cut-throat competition and price slashing continued to cause grave concern. Many of the leading men of the industry advocated a permanent national association. June 10, 1878, a call for a meeting of manufacturers of book papers and writing papers was issued. In this letter the outlook was referred to as "gloomy and depressing." With a view to obtaining an expression of opinion from manufacturers about the feasibility of uniting in any measure promising relief, this circular was sent to the paper manufacturers of the country, asking that an early reply be made, and stating preference as to time and place of meeting, and giving suggestions as to the best means of obtaining the desired results. During this period the Straw Wrapping Paper-Makers' Association had been agitating for cooperation among all mills to run at half-time for a period of a year.

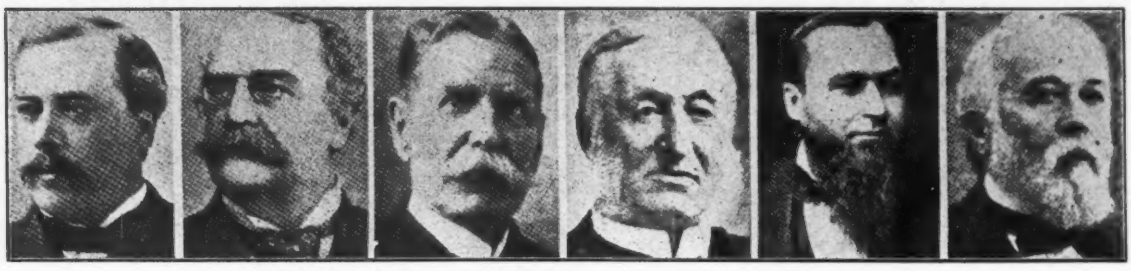
Papermakers, generally, were in accord with the plan for a national meeting. Howard Lockwood, who, for years, had been advocating an association of paper interests, in an editorial in the August 3, 1878, issue of PAPER TRADE JOURNAL, announced that it had been decided to call a convention of the trade to meet at Saratoga, New York, August 28, and stated:

"It cannot be expected that anything will result from this meeting unless it is made thoroughly representative. The mills which, from their standing and output, are able to almost dictate terms, must participate, and, while looking to their own benefit, must not ignore the claims of others who do not stand as relatively strong as themselves. The deliberation must be for the benefit of the whole trade, and selfish considerations, which follow the blind policy of looking only to the passing moment to snatch the little good it may give forth, should be put to one side. The future, more than the present, is to be considered. Conditions of trade are not hopeless, but they can be made so, and the action of the convention, and its results, will largely determine the good sense and determination of the trade."

Mr. Lockwood also advocated that advantage be taken of the opportunity this meeting afforded to form a permanent association of the industry, which, even if it did not control or attempt to regulate prices and production, could be made a bond of union to further the interests of the trade.

More than 100 of the leading manufacturers, representing all the branches of the paper industry, met at the Grand Union Hotel at Saratoga August 28. The American Paper Makers Association was formed, and the preamble to the newly formed organization stated that all paper manufacturers were eligible. A manufacturer was defined as an owner or stockholder on a sufficient scale to identify him with the management of a mill.

William Whiting, of the Whiting Paper Company, Holyoke, Massachusetts, was chairman of the meeting. On a motion of W. A. Russell, of Lawrence, Massachusetts, W. C. Plunket was elected president; C. C. Chapin and W. H. McClung, secretaries; A. E.



WILLIAM WHITING WELLINGTON SMITH J. W. FRENCH W. H. PARSONS BYRON WESTON E. C. ROGERS

William Whiting, President, 1878-80. Wellington Smith, President, 1880-83; Vice President, 1879-80. J. W. French, President, 1883-84; Vice President, 1896-98. W. H. Parsons, President, 1884-86. Byron Weston, President, 1886-88. E. C. Rogers, President, 1888-90; Secretary-Treasurer, 1886-88.

C. T. Crocker C. A. Dean C. H. Harding M. B. Mason N. T. Pulsifer O. C. Barber

C. T. Crocker, Vice President, 1885-86. C. A. Dean, Vice President, 1885-86; 1899-1901; 1906-07. C. H. Harding, Vice President, 1886-88. M. B. Mason, Vice President, 1886-90. N. T. Pulsifer, Vice President, 1888-89. O. C. Barber, Vice President, 1889-96.

Harding, of Ohio, William Whiting, of Holyoke, Massachusetts, Reuben Fairchild, of Boston, Massachusetts, L. C. Woodruff, of Buffalo, New York, and a Mr. Nixon, of Pennsylvania, vice presidents.

A committee of five was appointed to draft a constitution. It was decided that the association consist of a central executive committee, consisting of a president, two vice-presidents, secretary and treasurer, with headquarters at Springfield, Massachusetts, and five geographical divisions, with headquarters at Boston, New York, Philadelphia, Cincinnati and Chicago. Each division was to have its own executive committee, consisting of three members chosen from its particular group. The central committee was to arbitrate on all questions submitted by the executive committees of the various divisions, to determine the time and place of annual meetings, and to make assessments upon the members of the association to pay necessary expenses, such assessment to be apportioned according to the production of the mill represented. The duty of the executive committees, of the various divisions, was to carry into effect the action of the general association, and to consider and arbitrate upon all questions and matters arising within their respective divisions, and call together the members of the association, in the respective districts, when it was deemed necessary to carry out any of the business of the general association.

The association officers elected at this meeting were Hon. William Whiting, president; Hon. John T. Averill, vice-president; Wellington Smith, vice-president; Charles O. Chapin, secretary, and James Hill, treasurer.

Though there were some disagreements, the meeting, on the whole, was the most harmonious the industry had ever witnessed. It was decided to cut production to 85%, and a permanent association, including all branches, appeared in the paper field.

The American Paper-Makers' Association held its second annual meeting July 30, 1879, at the Grand Union Hotel, in Saratoga. All the officers of the executive committee were reelected.

Little was accomplished at this meeting, but it showed that the national association was not going to be allowed to die. In an editorial, commenting on the meeting, Howard Lockwood advocated that the Association be reformed, and divisions, organized on the basis of the kind of paper made, rather than on geographical districts.

Though the 1879 meeting at Saratoga resulted in no action taken to lessen the supply of paper, several times, during the year, the manufacturers of fine writing paper met to cooperate in curtailing production, and were successful. The Straw Wrapper Manufacturers and the Manufacturers of Board met and advanced prices, as did the Cincinnati and Chicago divisions of the American Paper-Makers' Association. This action was followed by stronger quotations all through the country.

A decrease in attendance, among certain groups at the third annual meeting, again held at Saratoga Springs, July 28, 1880, showed that the Association, apparently, failed in securing the cooperation of all its members. However, C. C. Woolworth read a paper on the export of American papers, thereby furthering the efforts of Howard Lockwood, who had long been trying to impress upon the industry the desirability of studying this feature of the industry. The value of the export trade had increased from $3,777 in 1869 to $1,200,000 in 1879. At this meeting Wellington Smith was elected president, and a plan was formulated to read papers on subjects broadly affecting the industry.

In announcing the fourth annual meeting, which was held in the same place as the preceding ones, PAPER TRADE JOURNAL suggested that trade subdivisions be made, instead of local organizations, and that all special Associations, such as the Wrapping Paper Makers or the Straw Board Manufacturers, should affiliate with the national Association, and have official representations on its executive and other committees.

This meeting was held July 27, 1881. With few exceptions all of the officers were reelected. Mr. Lockwood presented a paper on the export of paper, and presented a statistical table of the trade. This was the beginning of a practice that was to last for the rest of Mr. Lockwood's life, and was carried on for years by his successors.

At the 1882 meeting, J. W. French, of Michigan, was elected president. PAPER TRADE JOURNAL submitted a plan of cooperation, which was substantially approved. It called for the classification of the different branches of paper manufacture, and suggested

that a letter be sent to every paper mill in the country. It also advocated the enclosure of a copy of the Association's constitution, and asking the mills to sign an agreement to report once a month, giving their views of market conditions. This was to arrive at some equitable plan for curtailment of production, and also to agree to abide by decisions of the Association for temporary shut-downs, providing 75% of any class signed the agreements. At this meeting a committee was appointed to represent the wood pulp and paper industry before the Tariff Commission, and which this committee did in Chicago September 8.

For a long time there had been a growing feeling that there was something radically wrong with the manner in which the American Paper Makers Association was organized, and that, if anything was to be accomplished, a marked change would have to be made in the "working parts of the machine." At the 1883 meeting the constitution was amended, in line with the suggestion made by PAPER TRADE JOURNAL at the time of its formation. With the intention of combining the diverse interests in the paper trade of the country, the system of territorial division was changed. Six divisions were created, each of which represented one of the six leading classifications of paper manufacture. Six vice-presidents, representing the six grades, were chosen from the manufacturers of the various classes to represent their respective divisions. This enabled each division to assemble whenever it was deemed necessary or advisable to discuss the problems of its particular group, without losing the privilege of assembling yearly with the members of the entire industry.

J. W. French was reelected president, D. P. Crocker, secretary-treasurer, and the following vice-presidents: Writing—O. H. Greenleaf; Book—J. C. Ditman; Newspaper—J. L. Rubel; Manila—George West; Straw Paper—George N. Friend; Boards—Maurice Fitzgibbons. The name of the Association was changed to the American Paper Manufacturers Association. The action taken at this meeting greatly strengthened the organization.

However, PAPER TRADE JOURNAL was still advising that the Writing Paper Makers and the Straw Wrapping and Straw Board Associations, as well as all organizations of whatever character in the trade, join the national association as affiliates in order that the whole trade might become homogeneous, and the power, prestige and influence of the national Association become of real importance, to make it the most perfect and complete of any similar organization in the world.

At the 1884 meeting the paper makers of the west were conspicuous by their absence. The feeling of the western trade was voiced in a letter written by C. W. Scott, of the Richardson Paper Company, of Monroe, Michigan, which, in general, stated that nothing of practical benefit to the Association or the industry had been accomplished.

According to the statistical table presented by Howard Lockwood at that year's meeting, there were 1,082 mills, but only 85 of these mills paid the dues, based on ten cents per inch of total machine width. Granted that many companies owned a number of mills, the percentage of those contributing to the funds of the Association was exceedingly small. Conditions of the trade were depressing, and the outlook, due, chiefly, to the scarcity of raw materials, caused by the embargo on rags, resulting from the cholera epidemic, was clouded.

In order to make the Association more widely representative, and to permit the western manufacturers to hold their meetings nearer home, it was decided to increase the number of vice-presidents to twelve; that is, two for each division, one representing the western and the other eastern portions of the trade.

The feeling of dissatisfaction was still manifested at the following meeting, that of 1885. The condition of the manila and straw wrapping mills was particularly bad. Though production had been curtailed, prices continued to decline, and the manufacturers of these grades felt that they could not close down entirely, because manufacturers of other classes would not promise that they would refrain from running their machines on these grades. By 1886 the general conditions of the trade had grown worse, and labor's agitation for shorter working hours was an added problem. Though much was discussed, nothing was accomplished at the meeting.

The meeting of 1887 was a hurried one, the petition for a 65½ hour week, instead of 72 by the hour workers, was rejected, and a new departure had been

WARREN CURTIS F. C. SHATTUCK E. B. DENISON H. E. MEAD B. D. RISING F. H. PARKS

Warren Curtis, Vice President, 1889-91. F. C. Shattuck, Vice President, 1889-91. E. B. Denison, Vice President, 1890-91; 1899-1901. H. E. Mead, Vice President, 1890-02. B. D. Rising, Vice President, 1890-91; 1903-04. F. H. Parks, Vice President, 1891-92; 1900-01.

W. F. Whiting W. T. Barker A. W. Eaton J. N. Mohr A. G. Paine G. C. Sherman

W. F. Whiting, Vice President, 1891-94; 1896-99. W. T. Barker, Vice President, 1894-96; Sec., 1890-94. A. W. Eaton, Vice President, 1894-96. J. N. Mohr, Vice President, 1896-99; 1906-07. A. G. Paine, Vice President, 1896-99; 1907-09. G. C. Sherman, Vice President, 1896-99; Secretary-Treasurer, 1894-96.

made in the organization of a fibre division. The number of vice-presidents was increased to fourteen, to take care of this addition.

Increase in the production of wood pulp, and its effect on newsprint, manila and straw wrapping, was the principle theme of the 1888 meeting, at which E. C. Rogers, of Holyoke, was elected president. It was decided that future meetings were to be preceeded by a general banquet on the evening before the general sessions were opened.

At the 1889 meeting, E. C. Rogers was reelected president. The meeting was well attended, and the attitude, in general, was more optimistic. Two committees were appointed at this meeting, one to investigate the possibility of trade with South America, and to encourage the establishment of adequate steamship service between the two continents. The other was to investigate the systematic under evaluation of imported papers. A movement to hold future meetings in New York City was defeated.

Year of 1889 saw an increase in the export of paper, especially with regard to Great Britain. A number of mills were being built, the west especially showing signs of growth. The meeting at Saratoga in 1890 was remarkable for its large attendance, but the west still made a poor showing. Warner Miller reported on the export trade, and resultant decrease in mill failures. William A. Russell, noted news print manufacturer, was elected president.

Feeling that the Association was not doing what was expected of it, and having studied its history, William T. Barker, who had been elected secretary-treasurer at the previous meeting, stated that there must be something radically wrong in an Association with such a constitution as theirs, but no recognized membership, and officered, to a considerable extent, by gentlemen who neither attended the meetings nor contributed to the expenses of the organization. At his suggestion the constitution was revised. Purpose seemed to be to make the Association a purely social body. Supporters of the new constitution advocated it on the ground that the Association ought not to attempt any kind of legislation. Many felt that the revised constitution decidedly weakened the organization, and that nothing definite in connection with trade interests, aside from passing resolutions, could properly be done. Associate membership was also established, but was abolished by amendment at the following meeting. Membership was reconstructed on an individual basis. Those eligible were any manufacturer of pulp or paper in the United States, as principal or part owner, who would pay annual dues of $10. Divisions, according to kind of paper made, were retained, but the executive committees were abolished, and the number of vice presidents was reduced to one from each division.

The 1892 meeting was again held in Saratoga, but plans were made to hold the following meeting in Chicago, in order to secure greater interest among western manufacturers. Membership of the Association had increased to the extent of 47% in representation of the entire industry. For the first time since its inception, the Association had an exhibition of models and drawings of inventions and improvements, relating to the pulp and paper industry. This exhibition was considered very beneficial, and added greatly to the interest of the sessions. Warner Miller was elected president.

Protective tariff had greatly benefited the industry. Production, since 1881, had increased 219%, chemical fibre had grown nearly 59%, while prices had gone down and profits increased. Wages, too, were on a fair basis. Late in the year, the newspapers of the country began to raise a cry against the Association, calling it the "paper makers' trust." The Association protested, and pointed out that there was no confederation of capital, and no authority which could control the trade in the Association.

Due to the fact that times were "out of joint," the 1893 meeting, which had been scheduled for Chicago, was postponed, but an organization of paper manufacturers arranged the paper making exhibit at the World's Columbian Exposition by installing a modern paper machine, built by Pusey & Jones.

Seventeenth annual meeting of the American Paper Manufacturers' Association was held in the club room of the Grand Union Hotel, Saratoga Springs, New York, July 25, 1894. Attendance was better than expected. Association gave indication of growth and much more active life than heretofore. Col. Augustus G. Paine was elected president, and it was decided to hold the next meeting in New York. During the year,

a membership committee was formed, which succeeded in adding fifty to the roster.

First New York meeting of the Association was held January 3, 1895 at Delmonicos. Due to the time of the year and the depression, it was not very well attended, but some real business was done. Export committee issued a very comprehensive report, and an arbitration committee was formed. President Col. Augustus A. Paine, who was reelected, stated that the bottom had been reached, and that an up-turn in business conditions was eminent.

Meeting held February 20, 1896, in New York was not very well attended, and only a very small delegation from the west was present. It was decided to hold another meeting at Niagara Falls, which met June 22, at the International Hotel. George F. Perkins, of Perkins, Goodwin & Company, was elected president. During this year, the Association joined the National Board of Trade.

Since the revision of 1891 the practical utility of the Association had not kept pace with the social development, and, in May, 1896, the executive council met at the offices of Perkins, Goodwin & Company, and passed a resolution expressing their opinion that the Association should be made a business, and not purely a social, organization. At the Niagara Falls meeting, in June of that year, a committee was appointed to investigate the matter, and they reported at the February, 1897, convention that, while they considered changes desirable, the then sensitive conditions of the trade would make any radical changes unadvisable.

However, a number of amendments were adopted, the most important being that admitting to membership those not actually engaged in the manufacture of paper, such as paper merchants; and that changing the name to the American Paper and Pulp Association. Hugh J. Chisholm was elected president at the meeting, which was held at the then new Waldorf-Astoria hotel, which, from then on, with few exceptions, was the meeting place of the American Paper & Pulp Association. The year was marked by a determined effort to increase the membership of the Association, and agitation in favor of the establishment of permanent headquarters, with a salaried secreary.

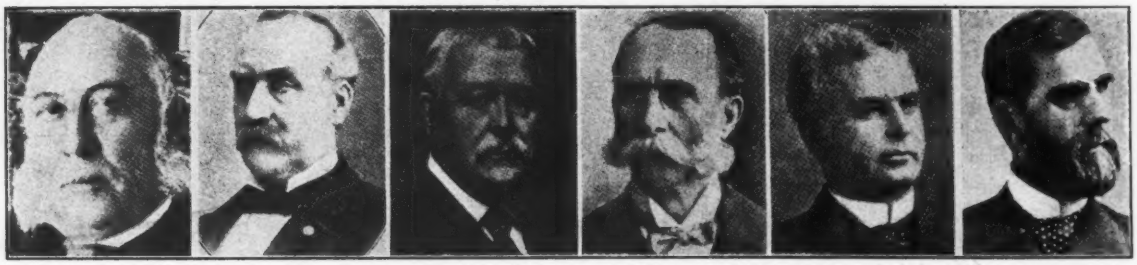
Improved business conditions were reflected in the cheerfulness of the twenty-first annual meeting of the Association in 1898. In point of attendance, the gathering was the largest in the history of the organization. Those who were present were impressed with the improvement in the character of the meeting. The Association put itself on record in favor of sound money; of the establishment of a Department of Commerce and Industry, to be represented in the cabinet by a secretary; of the building of the Nicaragua Canal by American capital, and the retention of it under American control; and of a more liberal postal policy on the part of the Government.

Among other questions taken up was that of the gathering of statistics of output and consumption; and, in the discussion of the question, there was recognized the fact that such statistics would be of great value to the entire trade, and would enable manufacturers to have a more definite knowledge of the needs of the market than they had at the time. Matter of a trade headquarters was also discussed, but no definite action was taken. Hugh J. Chisholm was reelected president.

During the preceding year there had been a gradual improvement in industrial conditions, the war with Spain ended, and confidence had been restored in the financial affairs of the country. Paper manufacturers were realizing the importance of expanding their markets, and, during 1898, the Association had gotten the Department of Labor, the State Department, and the Bureau of Foreign Commerce to collect data, made available to the industry on Cuban and foreign markets. Ex-Governor P. C. Cheney was elected president at the twenty-second annual meeting, held at the Waldorf-Astoria in New York, February 15 and 16, 1899.

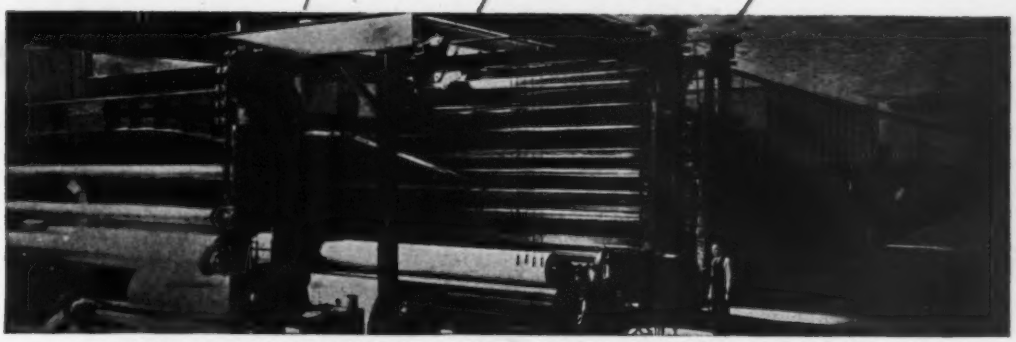
The 1900 meeting was a record breaker in point of attendance, and was especially gratifying in that all sections were well represented. Ontario and Quebec, by "stumpage tax" and pulp wood export duties, were forcing the industry of the United States to formulate methods of retaliation, while Canadian combines and building expansion were threatening our export trade. P. C. Cheney was reelected president.

Hon. Arthur C. Hastings was elected president and J. Sanford Barnes, secretary, at the 1901 meeting of the Association. Attempt of the Association to stimulate paper trade invention and literature, by offering prizes, had not been productive of results. No award was made because the few entries were not of a high

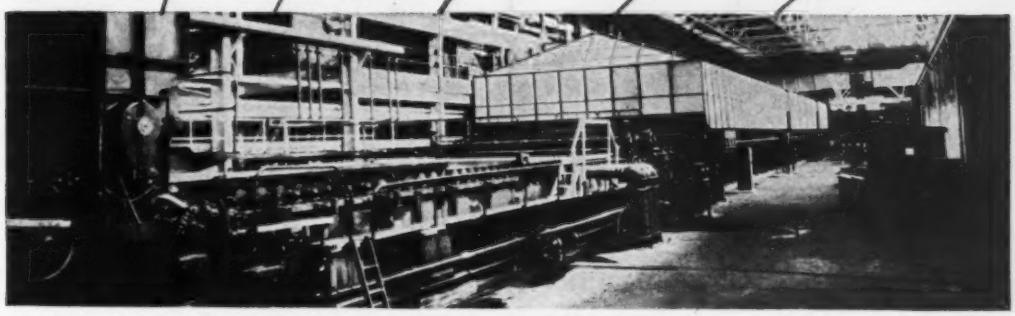


W. A. Russell | Warner Miller | A. C. Paine | G. F. Perkins | H. J. Chisholm | P. C. Cheney

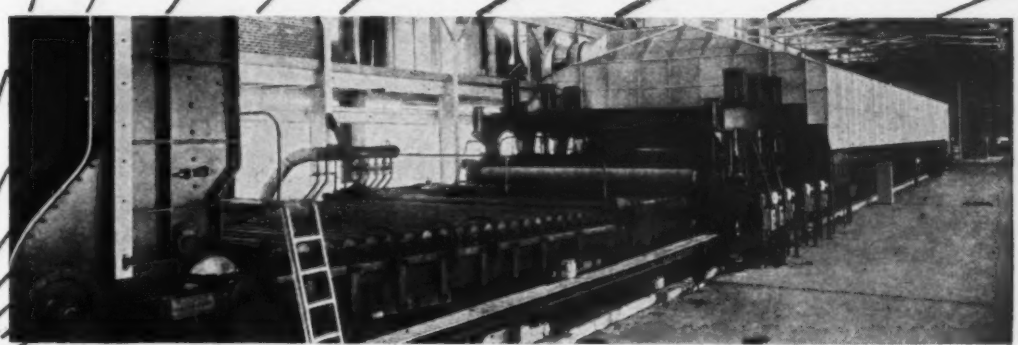
W. A. Russell, President, 1890-02. Warner Miller, President, 1894-94. A. G. Paine, President, 1894-96; Vice President, 1891-94. G. F. Perkins, President, 1896-97. H. J. Chisholm, President, 1897-99; Vice President, 1891-96. P. C. Cheney, President, 1899-1901.



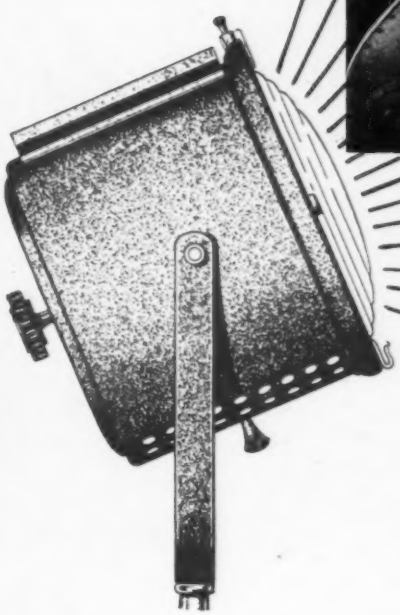
245" Fourdrinier Machine built for the Champion Paper and Fibre Company, Canton, N. C.



236" Fourdrinier Machine built for Union Bag & Paper Corporation, Savannah, Ga.



234" Fourdrinier Machine built for Hudson Paper Company, Palatka, Fla.

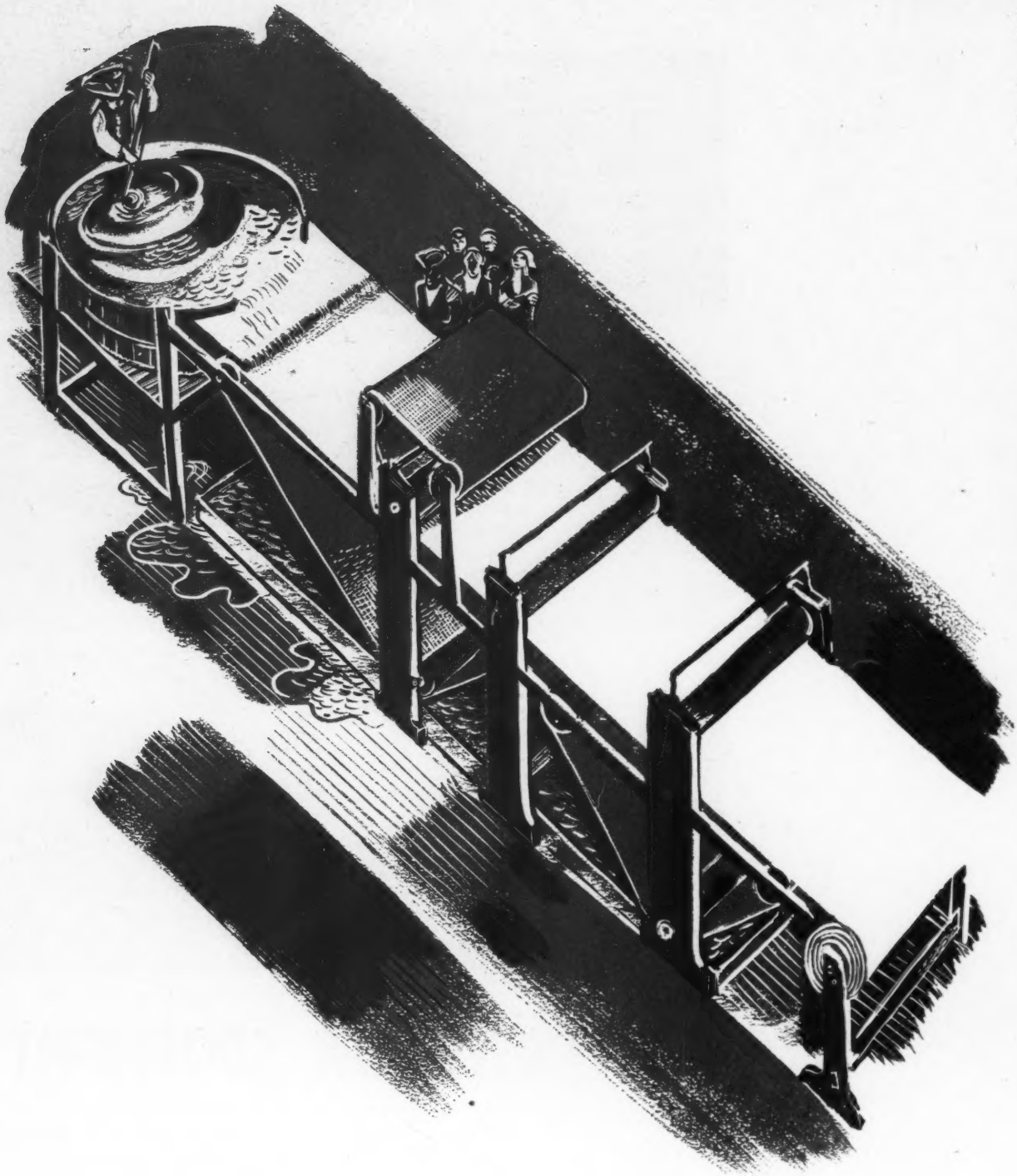


CENTENNIAL SPOTLIGHT

1848-1948. In this 100th Anniversary year as Machine Builders for the Paper Industry, Puseyjones is happy to turn the spotlight on three outstanding post-war installations. For high speed, large tonnage production of all kinds of paper, America's leading mills have always relied on Puseyjones design and manufacturing skill. If you would like a copy of the book, "A Trip Through the Puseyjones Plant", showing how Puseyjones Machines are built, write us today.

THE PUSEY AND JONES CORPORATION
Wilmington, Delaware, U. S. A.

THE SIGN OF TRADE MARK SUPERIOR QUALITY



The first Fourdrinier papermaking machine, developed and built by Bryan Donkin about 1807, after the design of Nicholas Robert.

CONTAINER CORPORATION OF AMERICA

You have to be GOOD to stay FIRST in Paper Packaging

IN THE LIFE SPAN of the Paper Trade Journal, the men who make paper and paper products have transformed America. Consider the field of paper packaging for example. 1872 was the bulk age of the cracker barrel and the general store. The only paper packaging was the grocery bag, the first machine-made paper package in the world.

Since those days paper packaging created by Union has revolutionized brand name merchandising and selling in hundreds of industries. Union has created specification paper packaging for thousands of products from aspirin to zweibach . . . from light perishable products like bakery goods and fresh vegetables to heavy industrial products such as cement and lime. And each year adds a surprising number of new products to the paper packaged group.

TRADE MARK UNION

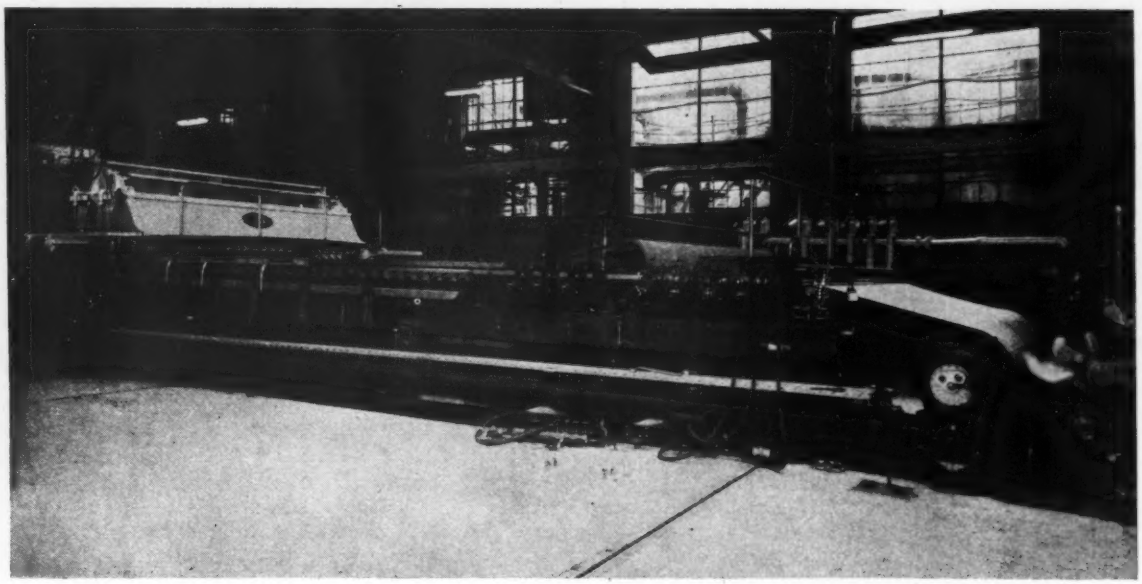
UNION BAG & PAPER CORPORATION, Woolworth Bldg., New York 7, N. Y.

DEPENDABLE PACKAGING SINCE 1872

P. H. GLATFELTER COMPANY

an 84 year old Mill
congratulates
the 75 year old

PAPER TRADE JOURNAL

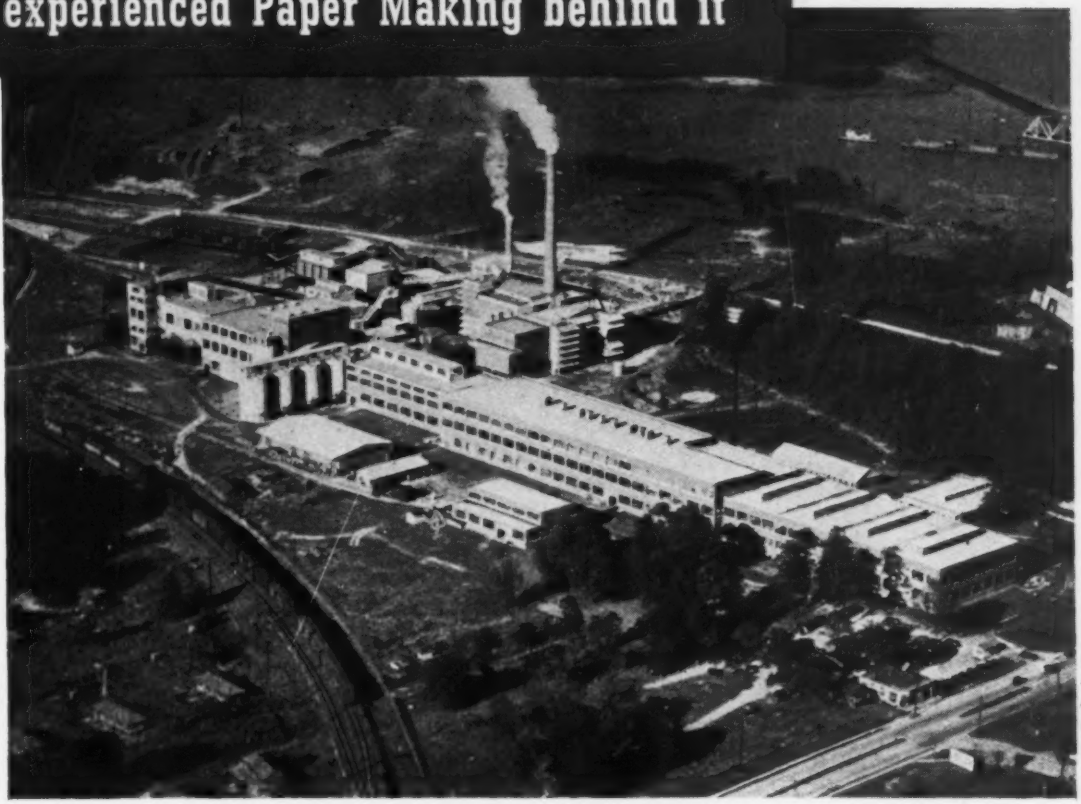


A six month old Fourdrinier
in an 84 year old mill

P. H. GLATFELTER CO.

SPRING GROVE, PA.

A seven-year-old Mill with a century of experienced Paper Making behind it



The most modern construction characterizes H&W's newest pulp and paper mill on the Mobile River in Alabama . . . completed just before the War. Processes are continuous and semi-automatic from the time the pulpwood leaves the wood yard to the completion of the paper at the end of the paper machines.

For Hollingsworth and Whitney believes in employing the newest in manufacturing methods and research just as firmly as it relies on four generations' experience in paper making to insure that the quality of paper produced is maintained at the highest possible standard.

HOLLINGSWORTH & WHITNEY COMPANY

Executive Offices: 60 BATTERYMARCH STREET, BOSTON, MASSACHUSETTS

Sales Offices:
230 Park Avenue, New York, N. Y.
111 West Washington Street, Chicago, Illinois

Paper by Master Craftsmen for Over a Century

TRADE MARK

MILLS AT WINSLOW and MADISON, MAINE and MOBILE, ALABAMA

MANUFACTURERS OF QUALITY ENVELOPES

FOR OVER HALF A CENTURY

SOLD THROUGH FINE
PAPER MERCHANTS
FROM COAST TO COAST

THE AMERICAN ENVELOPE COMPANY

WEST CARROLLTON, OHIO

KAROLTON ENVELOPE CO.
1521 W. HARRISON ST.
CHICAGO

MORAINE PAPER COMPANY, DIV.
WEST CARROLLTON, OHIO

★ 80 years

OF PAPER-MAKING PROGRESS

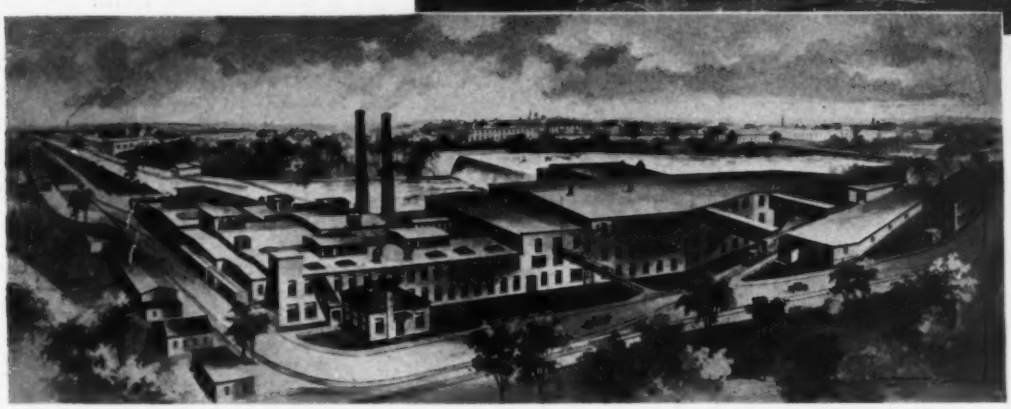
★ *1868* ▶

Original mill and log dam on Sugar River

★ *TODAY*

One of New England's finest mills

▼



IN 1868, our original mill started operations . . . deriving its water power from a rough, log dam . . . with only one paper machine . . . it founded its present distinguished reputation by making fine rag papers.

TODAY, the Claremont Mill covers several acres . . . is powered by a great hydro-electric development . . . is increasing its capacity for converted paper products such as imitation leather, aluminum coated insulating paper, coated and saturated grades, all of the best possible quality. We are also producing wet strength map and other technical papers which we manufactured during the war.

We have kept pace with the advancement of the paper industry and our facilities and research staff are at your disposal to help you solve any specification coated or kraft paper problems.

CLAREMONT PAPER CORPORATION

Claremont, New Hampshire

CONVERTING PLANTS: Chicago, Ill. Lynbrook, N. Y.

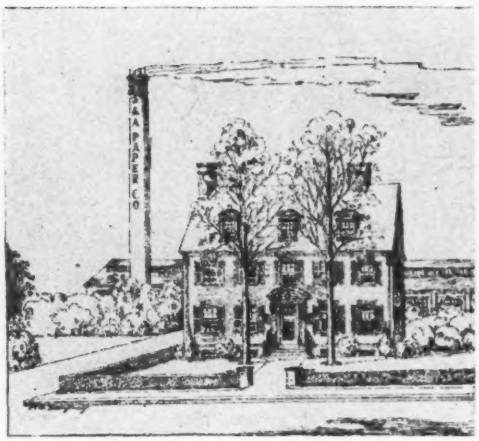
Offices: 155 East 44th Street, New York 17, N. Y. · 1387 Main Street, Springfield, Mass. · 1545 S. State Street, Chicago, Ill. · 124 W. 4th Street, Los Angeles, Cal.

150 YEARS OF PAPER MAKING

FIRST HUNDRED YEARS

The capture of Philadelphia by the British forces under General Howe left Congress no recourse but flight. After one hasty session in Lancaster, Pa. Congress moved on to York, Pa., where they convened for the first time in the Colonial Courthouse on Sept. 30, 1777. It was from Sept. 25, 1777 until June 27, 1778 that York, Pa., was the capital of the nation.

Now just twenty years later 1798 Philip J. King built a paper mill on this property for the manufacture of very high grade handmade note and letter paper.



Old "Mansion House" Built 1812

So well were these buildings put together that the original "Mansion House", erected on the mill property by Mr. King in 1812, is now used by the Schmidt & Ault company as its office building. After Philip J. King's death in 1829, his eldest son, George King, continued the management and operation of the mill, specializing in the manufacture of a grade letter paper named "Congress", which was sold in large quantities to the United States Government and to many customers in Baltimore, Philadelphia and New York.

In 1860 George King died and the mill was taken over by Alfred D. Jessup of Philadelphia, who was a partner of the Jessup & Moore Paper Co. of the same city.

Mr. Jessup installed a 48-inch cylinder machine, manufacturing an excellent grade of book paper. After Mr. Jessup's death, a relative, Jerry Horton, was brought to York from Holyoke, Mass., to manage the mill for the Jessup estate.

A flood in 1884 did considerable damage to the mill property and a little later, Elizabeth Jessup, a relative, sold out to the York Water Co.

It was in 1888 that the York Water Co. leased the property to A. A. Yerkes Wall Paper Co., Philadelphia, who used the mill for the production of wall paper or "hanging paper" as it was known at that time. This was probably the first manufacture of wall paper in York county. When Yerkes company took over the York mill, they took John McCoy of Philadelphia with them. He later on was instrumental in forming the York Card & Paper Co., which was afterwards purchased by the United Wall Paper Co., Inc. Mr. Yerkes' business continued until 1892, when it was purchased by the National Wall Paper Co. That company operated for about two years, when the mill was shut down.

LAST FIFTY YEARS

On December 11, 1896, Frank M. Rudolph of Hoboken, N. J., leased the mill from the York Water Co. and installed all new paper making machinery. He manufactured paper until July 7, 1897, when a partnership consisting of John C. Schmidt, Robert A. G. Ault and Mr. Rudolph continued operations, with Mr. Schmidt as chairman, Mr. Ault as secretary and treasurer and Mr. Rudolph as superintendent of the mill. The last named continued as superintendent until October 15, 1898, at which time Mr. Schmidt and Mr. Ault bought out his (Rudolph's) interest in the mill, then producing only about two tons per day.

In 1903 the Schmidt & Ault Paper Co. was incorporated by Mr. Schmidt and Mr. Ault, and since then, from time to time, alterations and additions have been made to the present machinery on which 200 tons are produced every 24 hours. Ample facilities for this manufacture are provided by the 13 acres of land located between the Baltimore division of the Pennsylvania railroad and the Codorus creek, which contain three railroad sidings, and can accommodate approximately 80 freight cars.

The present management continues to improve and modernize their facilities, always in an endeavor to meet the requirements of their customers, especially the converters. Their chief line of products include light-weight chip and corrugating material for the corrugators and tubing stock and setup boxboard. Henry D. Schmidt is president of the company, Horace Keesey, secretary, and Spurgeon Spangler, sales manager.

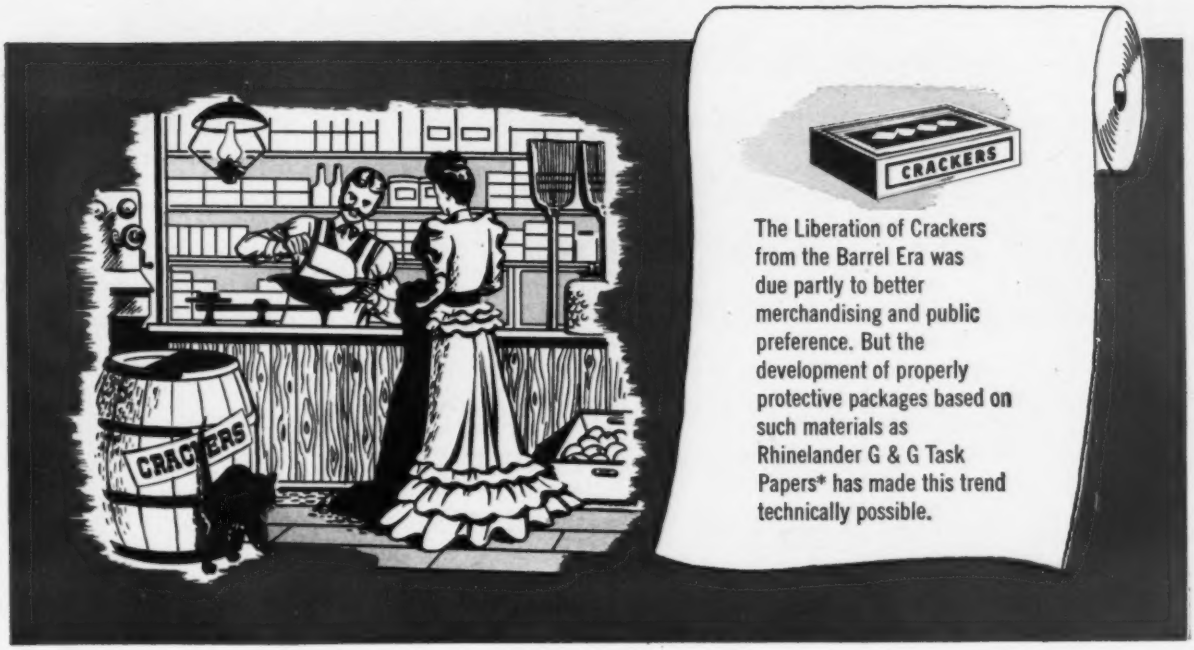
CODORUS

SCHMIDT & AULT PAPER CO.

YORK, PA.

CODORUS

All in a Day's Work at Rhinelander



The Liberation of Crackers from the Barrel Era was due partly to better merchandising and public preference. But the development of properly protective packages based on such materials as Rhinelander G & G Task Papers* has made this trend technically possible.

Corn Chips!—that crispy, crunchy tidbit with origins in Old Mexico and now capturing the American palate are good almost in direct ratio to the moisture tightness of their package. Millions of bags for this tasty food are made of special Rhinelander protective papers.

Every Candy Lover is familiar with those pert little chocolate colored paper cups that hold bon-bons. This seemingly insignificant item has its own set of fussy technical requirements . . . all met perfectly by a custom built Rhinelander task paper.

Good Ham!—what a gustatory triumph and how dependably good as produced by our fine American Packers. Usually two G & G Task Papers* as made by Rhinelander assist in bringing each ham to your table in prime condition.

Remember the Stereoscope that once graced most parlor tables? Its successor, the View-Master, gives pictures full color and three dimensional fidelity. Color transparencies are mounted on discs of Rhinelander paper—a remarkable functional sheet of multi-ply lamination, coated for heat sealing.

A Very Special Grade of Rhinelander Glassine may have helped to "set" this table. In plastic molding a Rhinelander task paper serves as a seperator sheet . . . preventing plastic panels from sticking to each other or to the giant presses that form them.

**Glassine and Greaseproof—the functional papers that do so many tough jobs well*

RHINELANDER PAPER COMPANY • RHINELANDER, WISCONSIN

CORRUGATED PAPER PRODUCTS

SHIPPING CONTAINERS

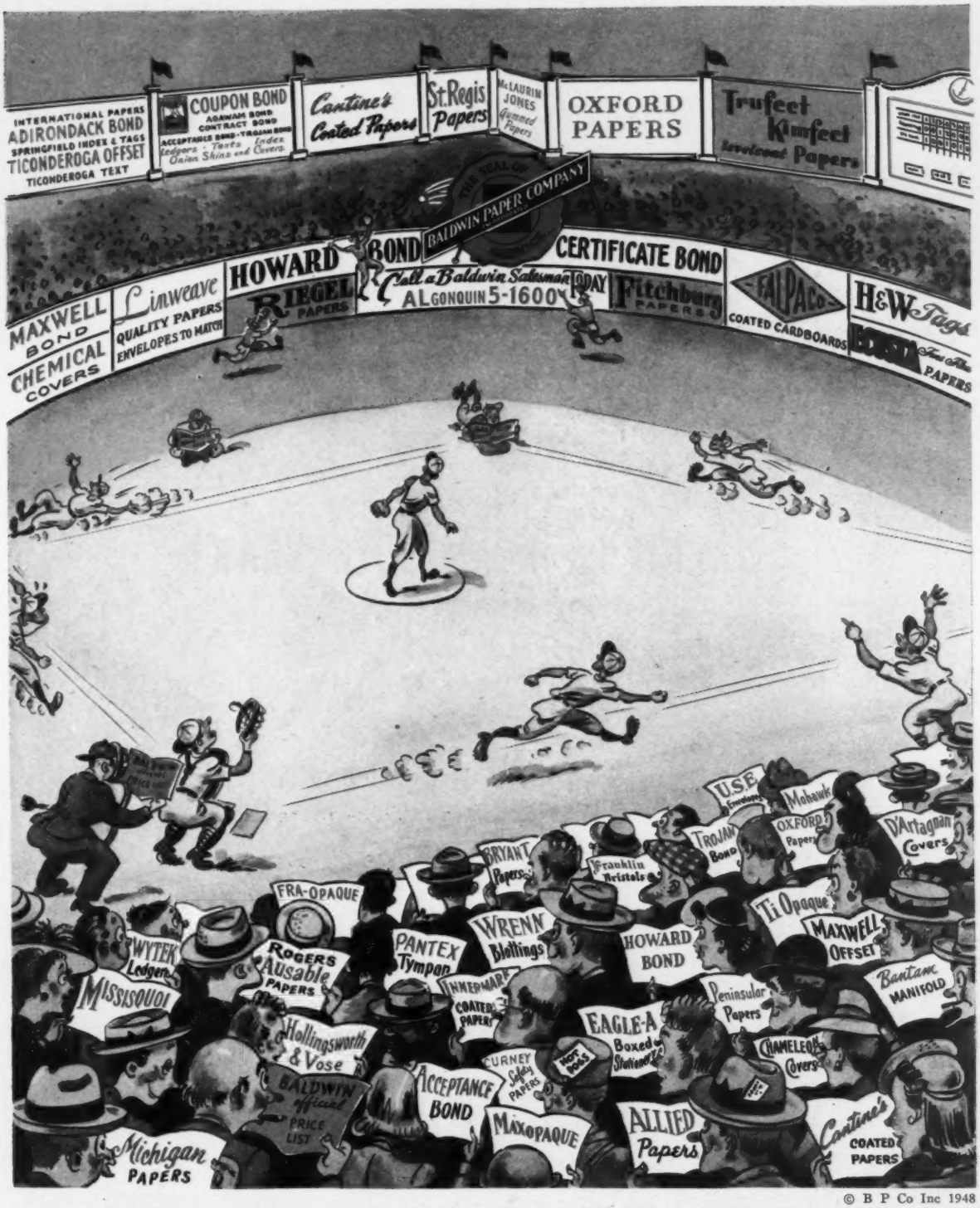
BOX BOARDS

SET UP AND FOLDING BOX BOARD

FIBRE BOARD AND STRAWKRÄFT

CAN, CAP AND TUBE STOCK

MANILA SPECIALTIES



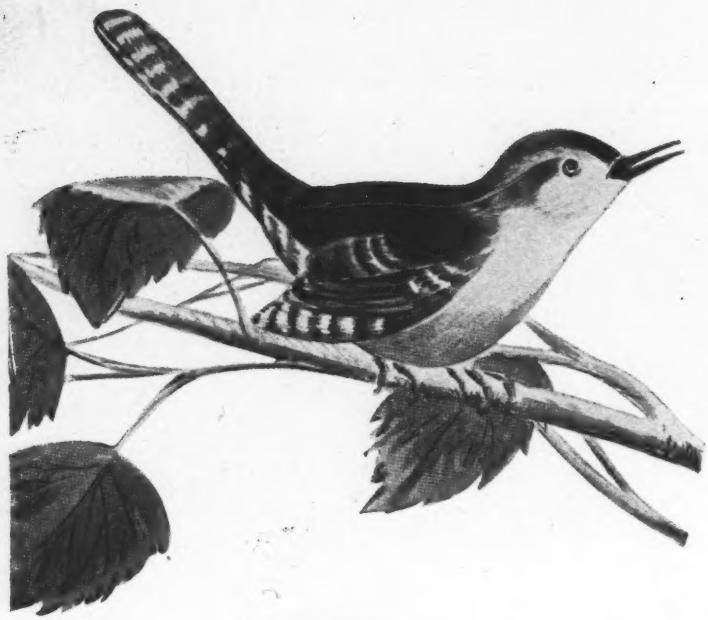
© B P Co Inc 1948

IN THE BIG LEAGUE—IT'S BALDWIN

Nearly every Printer in N. Y. refers to Baldwin's "Official" Price List

Send for a copy—or Call for a Baldwin Salesman **Today**—ALgonquin **5-1600**

Baldwin PAPER COMPANY, INC., 233 SPRING STREET AT VARICK, NEW YORK 13, N. Y.



Speaking of
Anniversaries...

WRENN is in its 90th YEAR!

Wrenn, with 90 years of growth and progress, has seen even more changes in the paper industry than Paper Trade Journal, now marking its 75th Anniversary.

BUT—throughout Wrenn's 90 years, one thing has not changed—that is Wrenn's insistence on UNIFORM HIGH QUALITY. The Wrenn name today, as throughout the years, stands for the best in blotting stock.

THE WRENN PAPER COMPANY MIDDLETOWN, OHIO

PULPS SUITABLE FOR EVERY PAPER MAKING REQUIREMENT

MO & DOMSJO A. B.

BLEACHED SULPHITES
White Horse Strong
White Horse Greaseproof
White Horse Special
White Horse Tissue
White Horse Soft

RAYON PULPS
Dissolving & High Alpha
Pulps for Rayon, Plastics
& Specialties

UNBLEACHED SULPHATE
Husum Kraft

BLEACHED SULPHATE
Husum White Kraft
Husum Bleached Hardwood

KORSNAS AKTIEBOLAG

BLEACHED SULPHITE
Roburwite

UNBLEACHED SULPHITES
"Selected" Mitscherlich
"L" Mitscherlich
"Glassine" Mitscherlich

BLEACHED SULPHATES
Vigorwite Kraft, Extra Strong
Extralba Kraft, Extra White
Manila Kraft, Semi-Bleached

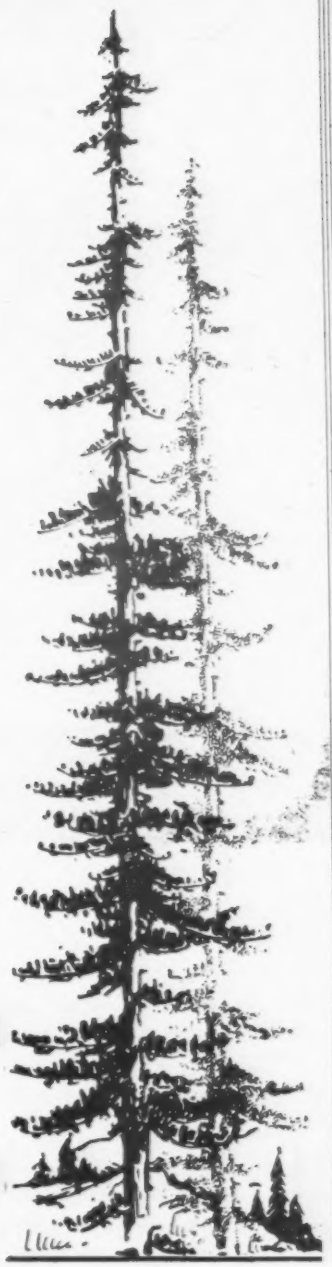
UNBLEACHED SULPHATES
Kraft "US"
Kraft "Z"
Kraft "Standard"

STORVIKS SULFIT AKTIEBOLAG

UNBLEACHED SULPHITE
Storvik "HS" Extra Strong
Mitscherlich

AKTIEBOLAGET ROBERTSFORS

UNBLEACHED SULPHITES
Robertsfors "RI" and "R" Direct
Cook Sulphite



Pagel, Horton & Co., Inc.

347 Madison Avenue, New York 17, N. Y.

ESTABLISHED 1916

first to establish a PACKAGE LABORATORY

Hinde & Dauch was first to establish a Package Laboratory. Starting as a sample room, H & D enlarged its facilities to include a modern, completely equipped Package Laboratory in its factories in the United States and Canada. From the Package Laboratory came the LIFE PRESERVER*, the first baby chick shipping box; the first corrugated box for shipping canned foods; PRE-PAK*, the first unit package. These and many other H & D "firsts" were developed in the Package Laboratory where scientific construction and design are employed to increase packaging efficiency and reduce packaging costs. The Hinde & Dauch Paper Company, 4701 Decatur Street, Sandusky, Ohio.

*TRADE MARKS REG. U. S. PAT. OFF.

LOOK TO

REG. U. S. PAT. OFF.

H&D

FOR PACKAGING "firsts"

HINDE & DAUCH · *Authority on Packaging*

FACTORIES IN: Baltimore 13, Maryland • Buffalo 6, N. Y. • Chicago 32, Illinois • Cleveland 2, Ohio • Detroit 27, Michigan • Gloucester, N. J. • Hoboken, N. J. Kansas City 19, Kansas • Lenoir, N.C. • Montreal, Quebec • Richmond 12, Virginia • St. Louis 15, Missouri • Sandusky, Ohio • Toronto, Quebec • Watertown 72, Mass.

HEARTIEST CONGRATULATIONS

BEACH & ARTHUR PAPER CO.

FOR THE BEST IN PROTECTION

In the field of protective packaging, Riegel serves as a "family physician" for many leading firms. We know what to do if things go wrong, but better still . . . we know how to help keep packaging healthy . . . in appearance, in cost and in production efficiency. For protective papers . . . for special papers of any type . . . always consult Riegel first.

Riegel Papers

FOR

PROTECTION • ECONOMY
PRODUCTION EFFICIENCY

RIEGEL PAPER CORPORATION • 342 MADISON AVENUE, NEW YORK 17, N. Y.

Yes, Sorg calling PAPER TRADE JOURNAL and congratulating you on your 75th anniversary. We know how proud you must feel of your long record of service and accomplishment, for we, too, came into being way back when. In fact it was in 1852. And that reminds us that there are more long established companies in the paper industry than in any other. That speaks well for the founders of the companies. It speaks well for those who followed in their footsteps. It speaks well for the industry as a whole and for all those whose foresight and ingenuity have so greatly contributed to its fine growth.

The Sorg Paper Company is indeed proud to be a part of this great industry whose many developments and accomplishments will continue to enrich the American way of life.

SORG PAPERS

SORG STOCK LINES: *WHITE SOREX • CREAM SOREX • EQUATOR OFFSET • EQUATOR INDEX BRISTOL • VALLEY CREAM POST CARD • MIDDLETOWN POST CARD • No. 1 JUTE DOCUMENT • BUCKHIDE TAG • FOR CONVERTING USE: DBL (Double Bleached Lined) • DIP (Dyed-in-pulp).*

THE SORG PAPER COMPANY • Middletown, Ohio

Offices: NEW YORK OFFICE: 370 Lexington Ave. (17). CHICAGO OFFICE: Daily News Bldg. (6). **Representatives:** BOSTON, C. H. Dodge, 10 High Street (10). LOS ANGELES, N. L. Brinker, 3217 Lowry Road (27). ST. LOUIS, H. E. Bouis, Ambassador Bldg. (1). **Member:** Miami Valley Paper Shippers' Association.

"Attention, Please!"

•

The Black Horse Ale and the Metropolitan Museum of Art four-color process car cards shown above were printed on Falpaco 4-ply single coated one side. The Chap Stick display was printed on Falpaco 10-ply single coated, one side. The Nelson Eddy window card was printed on Falpaco 6-ply, single coated one side. The Lewis Roberts, Inc. calendar was printed on Falpaco 4-ply, coated two sides.

DISTRIBUTED BY AUTHORIZED PAPER MERCHANTS FROM COAST TO COAST

A window card, a display, a car card or a calendar must command attention from all who come within range. The *stock* on which these jobs are printed contributes most importantly to their effectiveness. Perhaps that's why so many printers rely on the exceptional reproduction qualities of Falpaco Coated Blanks when halftones or four color process is used. Falpaco makes good on such a wide variety of jobs.

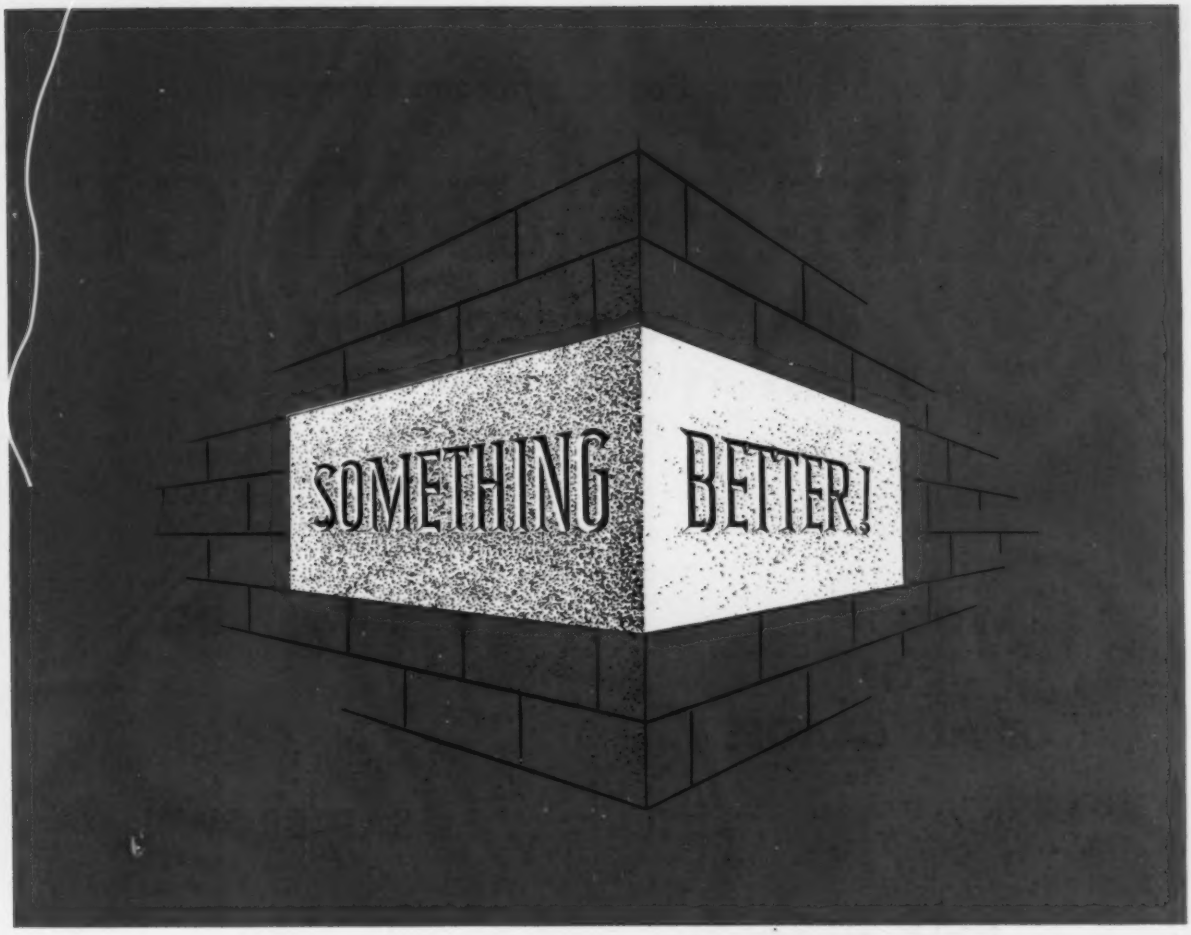
Falpaco Blanks are *specially* coated for letterpress—100% casein-sized. Due to the ingenious Falpaco manufacturing process you are sure of getting blanks that have less tendency to curl, shrink or stretch and which are distinguished by that so desirable, brilliant, blue-white color.

SPECIAL COATINGS FOR OFFSET, TOO

FALPACO

FALULAH PAPER COMPANY

NEW YORK OFFICE—500 FIFTH AVE., N.Y. 18 • MILLS—FITCHBURG, MASS.



"Something Better!"

IF THE paper industry might be said to have a cornerstone, it is easy to imagine its inscription. Since the days when papyrus was made along the Nile, men have sought "Something Better!"

Even today, the resources of this mighty industry constantly probe into faster, better ways to make more and better paper, and to place it in the service of more and more people.

All papermakers share the challenge to improve, if just a little, the work of yesterday. The four divisions of Howard Paper Mills, Inc., are proud to be a part of this never-ending conquest.

Howard Paper Mills
INCORPORATED

Howard Paper Co. Division, Urbana, Ohio
Aetna Paper Co. Division, Dayton, Ohio
Maxwell Paper Co. Division, Franklin, Ohio
Dayton Envelope Co. Division, Dayton, Ohio

After 50 Years, Business Becomes Pleasure:—

ALFRED BUNGE

ALFRED BUNGE COMPANY
45 WEST 45th ST., NEW YORK 19

Cable Address
ALFBUNGE, New York

Telephone:-
BRyant 9-9659
BRyant 9-7999

WOODPULP OF OF ALL GRADES

★

PULP AND PAPER MILL SUPPLIES

★

WAXES

★

SULPHATE OF ALUMINA

NEWSPRINT

★

SAP BROWN

★

CASEIN

★

GUTTA PERCHA AND TRANSPARENT HIGH MELTING POINT SPLICING TAPE

RIVER RAISIN PAPER COMPANY

Manufacturing Plants
MONROE, MICHIGAN
CLEVELAND, OHIO
WASHINGTON, PA

CORRUGATED AND SOLID FIBRE SHIPPING CONTAINERS
PACKING MATERIALS - FIBRE BOARDS - CORRUGATING STRAW - SILICATE OF SODA
PROMOTIONAL AND MERCHANDISING DISPLAYS

Sales Offices
TOLEDO CHICAGO
SYRACUSE DETROIT
MANSFIELD BOSTON
CINCINNATI KALAMAZOO
PITTSBURGH PHILADELPHIA
LIMA, O.

CHARLES L. WOOD
PRESIDENT AND GENERAL MANAGER

MONROE, MICHIGAN

February 16, 1948

Paper Trade Journal
15 W. 47th Street
New York 19, New York

Gentlemen:

We wish to offer our congratulations on this, your 75th anniversary, also for the fine job your publication has done for the paper industry over that period of time.

Yours very truly,

RIVER RAISIN PAPER COMPANY

Chas L Wood

President and General Manager

CLW/ph

IT TAKES A GOOD "PAPER"...

It takes a good "paper"—and in this case we refer to a trade journal—to maintain active, interested readership over a period of three-quarters of a century. We salute the "Paper Trade Journal" for its fine record of editorial excellence during the past 75 years and for the many contributions it has made to the advancement of the paper industry during this time.

The Detroit Sulphite mill was established in 1884, so we can almost be considered as having served the same generations as "Paper Trade Journal." And it is through our own experience that we can testify that it takes a good "paper"—whether the term is applied to a magazine or the product of a paper mill—to build and hold good will for so many years.

DETROIT *Sulphite*

PULP AND PAPER COMPANY
DETROIT 17, MICHIGAN

it's our 75th year too

Contemporaries in one of the world's great industries, the pulp and paper industry, Fraser Companies Limited and The Paper Trade Journal simultaneously observe their 75th year.

Bettmann Archive

The Fraser story spans three-quarters of a century—starting with the arrival of a group of Scotch colonists in New Brunswick in the Spring of 1873. The vision and fortitude of the founder and the activities and achievements of those who have followed after him are impressively reflected in the growth of the company.

From the first operation of a small sawmill at River de Chute on the St. John River in New Brunswick, by 2 men . . . and with subsequent additions and extensive expansions through the years, today's broad activities of Fraser Companies Limited and subsidiaries Restigouche Company Limited and Fraser Paper, Limited, require more than 2500 regular employees and over 5000 seasonal workers.

Products include bleached and unbleached sulphite woodpulp, groundwood pulp, paper board, lumber, lath and shingles—*bleached sulphite woodpulp* for the manufacture of paper, rayon and cellophane — *and in the paper field,* business papers for manifold and multicopy forms and letterheads, *converting papers* for carton wraps, drinking cups, treated food wraps, bread wraps, drinking straws, household rolls and many other specialties — *the printing papers,* Fra-opaque and Snowland Bond as well as *Fraser groundwood printing papers,* in rotogravure and letterpress finishes.

1873 1948

FRASER COMPANIES LIMITED

Edmundston, New Brunswick, Canada

(SUBSIDIARIES)

RESTIGOUCHE COMPANY LIMITED

Campbellton, N. B., Canada

☆

FRASER PAPER, LIMITED

Madawaska, Maine, U. S. A.

RELIABLE

These are more than just trademarks . . . they represent years and years of experience in the manufacture of the finest gummed tapes, gummed papers, laminated and coated papers and specialties.

SEAL WITH Sterling Tread GUMMED TAPE
LOOK FOR THE TAPE WITH THIS CORE ®

Trojan GUMMED TAPE ®

Trojan BOX TAPE ®

Trojan SUPER Kraft Gummed Paper ®

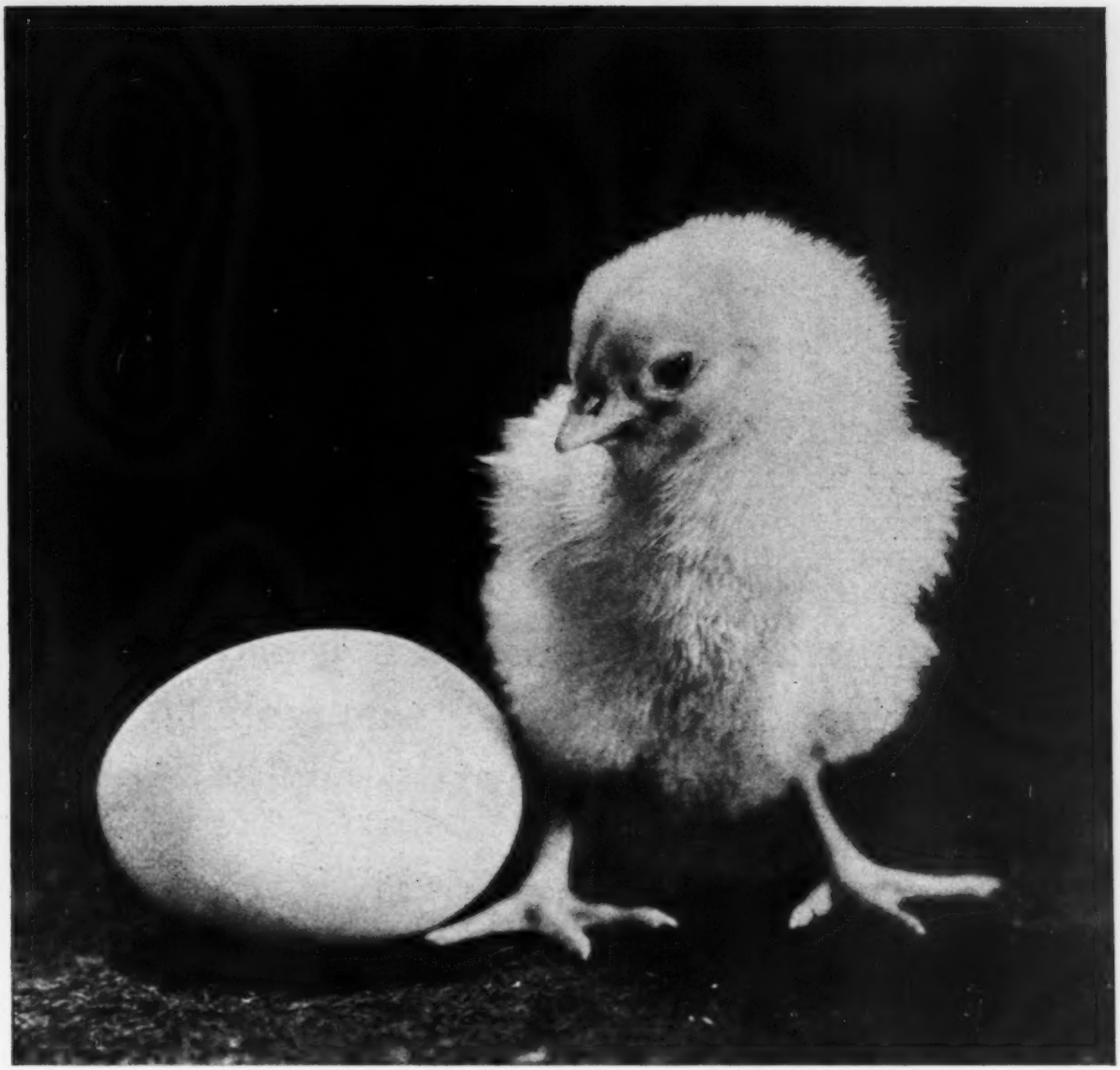
Trojan Foil ®

THE GUMMED PRODUCTS COMPANY

OFFICES • TROY, OHIO • MILLS

Chicago • Cincinnati • Cleveland • Los Angeles • New York • Philadelphia • St. Louis •

"When you think of *gummed products*, think of GUMMED PRODUCTS!"



No question which comes first at Crystal

For centuries there has been an unsolved problem of which comes first—the chicken or the egg. At Crystal Tissue, when it comes to producing Wrapping Tissues, Waxed Papers and Christmas and Everyday Gift Wrappings, there is no such problem because QUALITY *always* comes first. • For years the Crystal trade-mark has stood as an emblem of integrity in manufacturing and dependability in service to the paper trade. Your first thought should be "Crystal" whenever quality tissue products are needed.

Crystal

THE CRYSTAL TISSUE COMPANY, MIDDLETOWN, OHIO

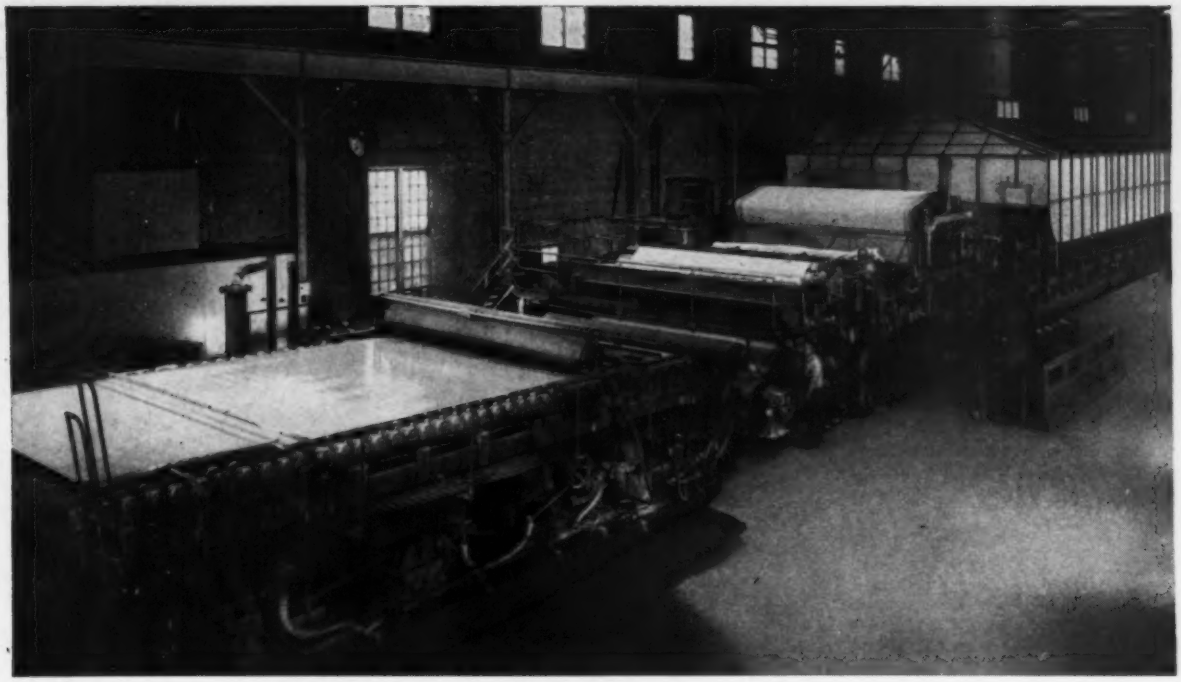
Congratulations

to Paper Trade Journal on its 75th Anniversary. This long span of service to the Paper Industry is an accomplishment in which you may take justifiable pride. And if our own venerable 86 years entitle us to say so—the first 75 years are the hardest.

Fitchburg Fine Papers
for Printing & Converting

Fitchburg Paper Company *FOUNDED IN 1861*

MILLS AND MAIN OFFICE: FITCHBURG, MASS. N. Y. OFFICE: 250 PARK AVE., N. Y. 17 • 11 SO. LA SALLE ST., CHICAGO



Hammermill's No. 7 paper machine which went into production in December, 1947

The Best Years ARE AHEAD

In the good old days of fifty years ago, American paper consumption was about fifty pounds per capita. This year it will reach nearly one pound every day for each man, woman, and child in the United States.

But we haven't seen anything yet. As our living standards rise, more and more paper is needed. As our industrial capacity increases, paper must furnish the business tracks for both production and distribution.

Hammermill has kept pace with the growing demand. Starting with two paper-making machines, it celebrates its fiftieth birthday this year with seven Fourdrinier giants in operation.

It celebrates with ever-increasing production, for the challenge of the future leaves no time to look backward. America is headed for better years than it has ever seen before, and Hammermill is helping to supply the paper that will make those good new days possible.

HAMMERMILL PAPER COMPANY • ERIE, PENNSYLVANIA

Congratulations

to

THE PAPER TRADE JOURNAL

On their Seventy-Fifth Anniversary

From the

HOPPER PAPER COMPANY

Manufacturers of

OFFSET, SUNRAY, PAPETERIE,

and other fine specialties

Mills located at

Taylorville, Illinois

Reading, Pennsylvania

1948

17 · 4 · U

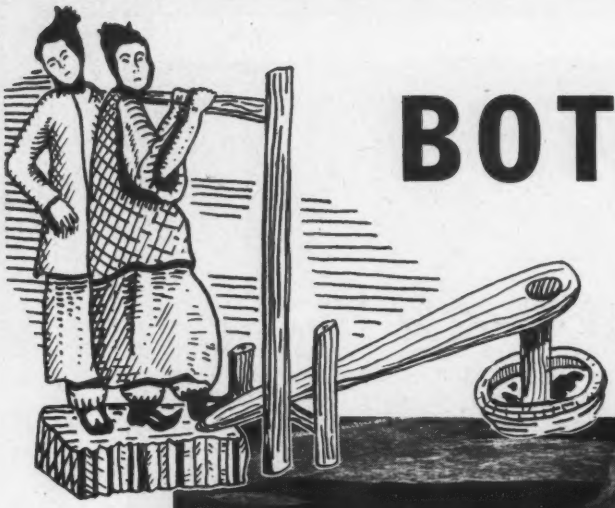
EASTERN U. S. A.

A Good Number!

Yes, SEVENTEEN FOR YOU . . . . seventeen strategically located Hubbs Houses are ready to help you **sell more of your products** in America's No. 1 Market. We have the trained salesmen. We have the contacts. We enjoy the confidence of the world's finest mills and converters. If YOU have the desire for stronger representation and greater sales in Eastern United States.

Please **CONTACT THE HUBBS HOUSE NEAREST YOU**

WAREHOUSES AT ALL THE ABOVE



BOTH are . . .

PULP MILLS

One dates back to T'sai Lun, the world's second papermaker. (The first was *Vespa maculata,* the hornet, or papermaking wasp.) The other is KVP's model new mill at Espanola, Ontario - the last word in sulphate pulp mill construction.

KVP often called *The World's Model Paper Mill,* is the parent organization of the following plants, specializing in

FOOD PROTECTION and HOUSEHOLD PAPERS

Kalamazoo Vegetable Parchment Co.
Devon, Pennsylvania

Harvey Paper Products Co.
Sturgis, Michigan

KVP Company of Texas
Houston, Texas

Appleford Paper Products Limited
Hamilton, Ontario • Montreal, Quebec

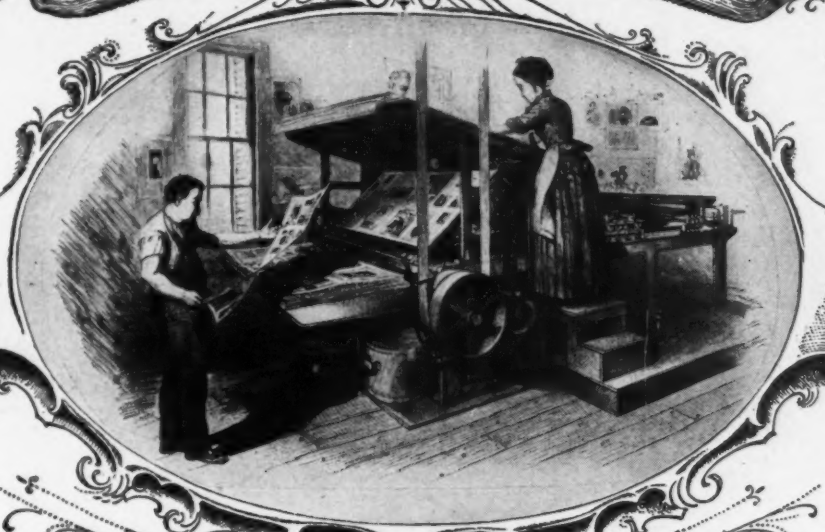
KVP Company Limited
Espanola, Ontario

Aridor Limited
Hamilton, Ontario

KVP

KALAMAZOO VEGETABLE PARCHMENT COMPANY
PARCHMENT • KALAMAZOO 99 • MICHIGAN

1898 FIFTIETH ANNIVERSARY 1948



The Bettmann Archive

TEMPUS FUGIT

OR THE FIFTY YEARS THAT SAW A NEW WORLD BORN

A half-century is not so long in time. But in terms of the changes they have brought *these* 50 years just past seem ages long. Think of the printing industry, for example (as typified by the shop above, which may well have been one of our first customers). Handwritten copy, set by flickering gaslight with a red hot, pot-bellied stove providing the air conditioning.

But what a job they did . . . editor, ad man, printer, yes, and paper-maker, too. They changed our thinking and our way of life. Unceasingly, they preached the gospel of Democracy and prepared us to accept and later to demand its material benefits, providing the markets that made them possible in greater profusion than in any other spot upon the globe.

They chased the grocery store cat from the cracker barrel and prune box and brought immaculately packaged foods and fresh uncontaminated milk to the American home. Through printed education, they helped to make our public health the envy of the world.

It's been a phenomenal fifty years for America.

And, as we pause at the threshold of our second half-century, we look back at the past and humbly tip our hat. INTERNATIONAL PAPER COMPANY, 220 East 42nd Street, New York 17, N. Y.

INTERNATIONAL PAPERS

For Printing and Converting

FIFTY YEARS OF PAPER MAKING

Congratulations

TO

THE PAPER TRADE JOURNAL

ON THE OCCASION OF

ITS 75TH ANNIVERSARY

CELLULOSE SALES COMPANY
INCORPORATED

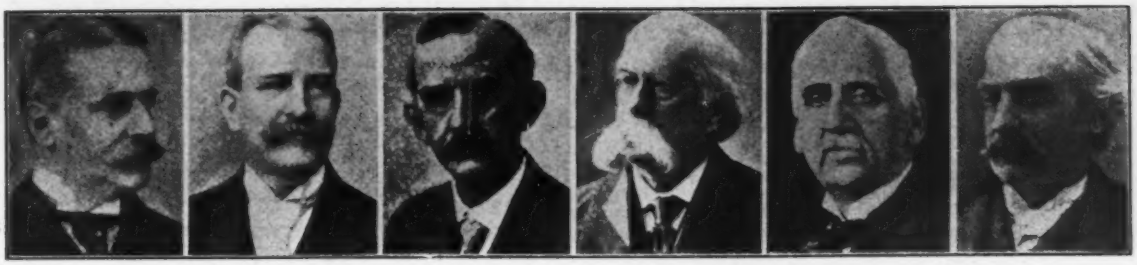
Wood Pulp

250 PARK AVENUE

NEW YORK

GENERAL DYESTUFF CORPORATION

NEW YORK



S. P. Train | M. M. Armstrong | W. M. Crane | G. W. Hammond | Frank Squier | Elisha Morgan

S. P. Train, Vice President, 1897-99. M. M. Armstrong, Vice President, 1899-1901. W. M. Crane, Vice President, 1899-1900. G. W. Hammond, Vice President, 1899-1901. Frank Squier, Vice President, 1899-1901. Elisha Morgan, Vice President, 1900-01.

enough order to justify a prize. The Association showed a steadily increasing membership. Export trade was constantly increasing. In his report, the president called attention to the growing scarcity in the supply of wood, and emphasized the need of intelligent forestry.

When the association met in 1902, to celebrate its twenty-fifth anniversary, guests were agreeably surprised to receive, as a souvenir of the occasion, a two-gold-band Waterman "Ideal" fountain pen. Each diner received one, tied in a nearly embossed box. Pens were presented to the association by the L. E. Waterman Company. During the preceeding year the volume of business had been steady, and prices reasonable. Financial standing of the trade was high, expansion had been gradual and well advised, Labor situation was again demanding attention.

The Paper Trade Journal was still agitating for a full time salaried secretary, and permanent headquarters for the Association, and was receiving the support of many prominent men in the industry and the Association. A resolution advocating the formation of such a plan, and inviting the opinion of the members, was adopted. It was also resolved that there be formed a permanent Census Bureau, through which more complete statistics of the paper trade, together with other industries, might be obtained.

In his address as president before the 1903 meeting, A. C. Hastings emphasized the need of technical education for pulp and paper manufacturers. Considerable time was devoted to the discussion of the advisability of employing a salaried secretary, and establishing permanent headquarters. Though economic conditions were exceptionally good, labor was making more demands. In his address before the 1904 meeting, President C. W. Knowlton stated: "If the threat of labor troubles could be eliminated, the business outlook would seem to be favorable, and the employer and the employed would have reason to be hopeful, and prosperity assured, but the attitude of the workingmen, through their several organizations, has given to all of us a feeling of uncertainty that hampers, not only the paper business, but every line of business in every part of the country.

"How long these conditions will prevail, no one can tell. Brute force can produce only one result, and that is ruin. Ruin to the manufacturers cannot help the workingman, unless he is of that makeup that would rejoice in any kind of wreck, and we think we are correct when we say that the majority of wage earners deprecate the attitude many of the labor organizations have assumed, but, unfortunately, that majority has not been in a position to make itself heard or felt. The result has been, in not a few cases and in many places, almost a state of war, and I think we all agree, be he rich or poor, that this is not good for the country; that some day this state of affairs will result in a reaction that will hurt all, and it will take many years to undo the harm that had been done, and is being done.

"The rights of the workingmen are as sacred as the rights of the man with capital, not more so; but the man with capital, who attempts to work along lines not in accord with the rules laid down by the labor union, and the non-union man, who is willing to work, and wants to work to support wife and children and himself, have been hardly safe from bodily harm during the years 1902 and 1903."

By the time the Association met in New York in 1905, the labor situation was somewhat improved. The strike in the Holyoke mills had ended, and the shrinkage in the output of fine papers, amounting to about 14,000 tons, had depleted stocks throughout the country, to the extent that a fairly good demand resulted, together with increased prices. In his report before the meeting, Secretary Wright dealt with a matter that, in one shape or another, had been before the Association for several years. He stated that, in its present condition the Association did not live up to its name or its principles. It was all play and no work, and it was little to be wondered that the business sessions were attended by so few of its members.

Twenty-eight years earlier the Association had been organized as a manufacturers' Association, and, for years, its meetings were characterized by discussion of its business affairs, the members of the Association furnishing both the topics and the verbal consideration of them. They were decidedly interesting discussions, full of matter of value to the entire industry. He further stated that the Association should be of substantial and practical service throughout the entire year, which could be brought about only by the establishment of permanent headquarters, in charge of a permanent secretary. In June, 1905, permanent headquarters were established at 309 Broadway, New York.

Overproduction, increased cost of production, and senseless price cutting were the evils complained of at the 1906 meeting. The really bad feature of the trade situation, during the year, had been the unnecessary sacrifice of values, due to eager competition for orders. Most manufacturers, being afraid of an enforced shutdown for want of orders, took the order, regardless of price. Committees were appointed, by the vice presidents of each division, to investigate the possibility of standardizing weights, colors, sizes, finishes, etc., and to make 500 sheets the standard ream count, instead of 480 or 512. An agreement was made, whereby the executive councils of the American Paper and Pulp Association and the National Paper Trade Association would meet to discuss mutual problems whenever it was deemed necessary. During 1906, the membership of the American Paper and Pulp Association split into active and associate members.

At the 1907 meeting only active members were permitted to attend the business sessions. Arthur D. Little was appointed official consulting chemist of the Association for a term of one year, at a salary of $50. Banquet that year was the greatest the Association had ever held, over 700 guests being present. David S. Cowles was elected president. The new secretary, Louis Chable, was considered an ideal selection, as he had had five years' experience as secretary of the committee on interstate and foreign commerce of the House of Representatives, and three years in consular posts. Besides that, he represented the Nicaragua Canal Company, in Nicaragua and Costa Rica.

Widespread paralyzing character of the panic, which started in October, 1907, through the exposure of a coterie of daring financial speculators, was apparent in the feeling of insecurity which seemed to pervade the 1908 meeting. The American Newspaper Publisher's Association had petitioned President Theodore Roosevelt to form a congressional committee to investigate the newsprint industry, charging price fixing, and other practices that forced the publishers of the country to pay prohibitive prices for paper.

It was resolved that the president of the American Paper and Pulp Association appoint a committee to more particularly inform the President of the United States, the Congress of the United States, the press and the public as to the unwarranted and injurious character of this attack upon an industry that had become one of the mainstays of the country, and had enabled the United States to become, by far, the greatest paper producing and consuming country in the world

By an amendment to the constitution of the Association, Arthur C. Hastings and Louis Chable became the permanent president and secretary of the Association. That is, they were to hold office until they saw fit to resign, or until new men were elected. Besides making permanent the offices of president and secretary-treasurer, two more innovations were made: one in the provision for a single vice-president, who was to perform the duties of the president in the absence or disability of the president; the second, in designating the former vice-presidents, representing the different divisions, as members of the executive council. In regard to the latter, the change was in name, only. Under this new arrangement the general charge and control of the affairs of the association were in the hands of the executive council. During the preceeding year Congress had begun its investigation of the newsprint industry, the proceedings of which filled five volumes, and embraced the entire history of newsprint manufacturing.

Business sessions of the thirty-third annual meeting were unusually instructive because of the valuable papers read by Arthur D. Little, Philip S. D. E. Douty. Paper read by Mr. Little was of special interest because of his recommendations in regard to the necessity of starting a school for paper making. Louis Chable resigned as secretary of the Association, but agreed to hold office until his successor was chosen. The paper industry had shared in the general improvement in business conditions. During 1909, the demand for paper had increased fifteen per cent. President Hastings, in his annual address, pointed out that the per capita consumption of paper had increased, during the preceding thirty years, from thirty-five pounds to one hundred pounds, in spite of the fact that the population had practically doubled. Uniform cost sheets were supplied by the Association, with a recommendation that more accurate cost records be kept by the mills.

Feature uppermost in the minds of the paper men, who gathered in 1911, was the Canadian reciprocity act, which virtually presented as a gift the newsprint industry of the United States to Canadian manufactur-

J. B. Forsyth J. G. Luke C. S. Merrill C. W. Rantoul J. S. Riegel G. E. Bardeen

J. B. Forsythe, Vice President, 1901-03. J. G. Luke, Vice President, 1901-03. C. S. Merrill, Vice President, 1901-03. C. W. Rantoul, Vice President, 1901-03; Secretary-Treasurer, 1899-1901. J. S. Riegel, Vice President, 1901-03. G. E. Bardeen, Vice President, 1903-05.

J. S. Barnes | Frederick Bertuch | J. R. Carter | Frank Grubb | J. A. Roberts | W. O. Ball

J. S. Barnes, Vice President, 1903-05; Secretary-Treasurer, 1901-03. Frederick Bertuch, Vice President, 1903-05. J. R. Carter, Vice President, 1903-05. Frank Grubb, Vice President, 1903-05. J. A. Roberts, Vice President, 1903-05. W. O. Ball, Vice President, 1904-06.

ers. With a view of improving trade customs, and increasing cooperation in the general paper business, it was suggested that an arbitration board be established by the manufacturers, jobbers and printers, through the American Paper and Pulp Association, the National Typothate of the America, and the National Paper Trade Association. It was also suggested that a better cost system was necessary.

January 1, 1911 the experiments at the Forest Service Ground Wood Laboratory, at Wausau, Wisconsin, were begun. H. Stanley Bristol, assistant director of the Forest Products Laboratory, Madison, Wisconsin, read a paper on the work being done. The lecture was illustrated by lantern slides. Because of increased membership and the importance of the topics discussed, this meeting was the most outstanding in the history of the organization. It brought together the largest and most representative gathering of papermen held up to that time.

Address delivered by President Arthur C. Hastings, before the thirty-fifth annual meeting of the American Paper and Pulp Association, gave a resume of trade conditions. He stated that the profits of the paper industry were not adequate pay for the wear and tear on plant and physical condition, and over production was an ever present bugaboo. He pointed out that, to get a reasonable return upon his labor and investment, a manufacturer must guide his operations according to the law of demand, and avoid over production as he would a bad debt. To acquaint himself with the demand he must rely upon the data furnished him by the Association, and it was his duty, at the same time, to post his organization on the details of his deliveries. Mr. Hastings also pointed out the necessity of a publicity bureau, where new uses for paper might be investigated, new inventions inquired into, and where anything pertaining to the paper industry, as a whole, might be taken up in an intelligent way, with a view of development.

Mr. McNair, in making the secretary's report, pointed out that the time had come when the office of secretary and treasurer should no longer be purely honorary, that there was a fertile field for originality, ingenuity and efficiency, and that the president was entitled to the cooperation and assistance of a man capable of filling the position, and devoting all of his time and energies to the duties involved. In the chemist's report, Arthur Little again stressed the need for a school of paper making in this country.

Judge Charles F. Moore was elected secretary of the Association at its 1913 meeting. President Hastings recommended a uniform system of cost accounting, that would enable mills to compare costs, with the ultimate result of more uniform market prices, and, also, of bringing forcibly to the minds of many manufacturers the fact that they were not making a profit.

Judge Moore withdrew as secretary of the Association in December, 1913, in order to manage the statistical bureau of the book paper manufacturers. At the annual meeting, Arthur C. Hastings retired as president, in order to assume the duties of president of the United States Paper Export Association, to which he had recently been elected. However, no election was held at the 1914 meeting, and it was not until several months later that his successor, Frank L. Moore, was chosen. No secretary was elected until the following year. At this meeting it was resolved that the form of organization should be altered, and that, thereafter, divisions should be formed, which would be members of the parent Association, and contribute to its support, their members becoming, by virtue of membership in the division, members of the parent Association, without further payment of dues. Announcement was made of the establishment of a course in paper making at Maine University, at Orono, under the supervision of Prof. Ralph McKee. This was the first course of its kind offered in the United States.

Upheaval caused by the outbreak of World War I manifested itself in a general feeling of uncertainty at the 1915 meeting. The Clayton anti-trust bill and workmen's compensation laws added to the gloom. Frank Moore was reelected president. The plea for technical control by Arthur C. Hastings, during his term as president of the Association bore fruit at this meeting. A plan was presented to the members for a new division, to be called the technical division. Its work would be to gather and disseminate information concerning matters that had to do with actual production. After undergoing unprecedented dullness for eight months, all branches of the paper trade experienced a phenomenal revival, the full fruits of which were not realized because of the shortage and high prices of

nearly all papermaking materials. The dyestuff famine was the outstanding feature of 1915.

The 1916 meeting of the Association was one of the most remarkable in the history of the organization. After an eight months' slump, during which both foreign and domestic consumers were using up their reserve stock in the hope that the war would not last very long, there was a general demand for all products, and soon the paper mills were running at capacity. Scarcity of colors, sulphite, and other stock soon became so acute that the manufacturers were forced to advance prices to cover the increased cost of making paper. This resulted in a desire of the members of the trade to get together and discuss affairs that had become more acute than usual. Lobbies and other suitable meeting places were crowded throughout the two days of the convention.

Consumers and jobbers had gathered to meet the mill men, while the supply dealers were seen on every side, explaining their difficulties, and advising that stock be brought up before the market had time to further strengthen. Technical division, which was organized on April 6, 1915 in Chicago, now numbered 207 members, and unusual interest was manifested in its possibilities. It became a regular division of the American Paper and Pulp Association at this 1916 meeting, and it was decided to change the name from technical section of the American Paper and Pulp Association to the Technical Association of the Pulp and Paper Industry. A. B. Daniels was elected president of the American Paper and Pulp Association. At this meeting the newsprint division withdrew from the association.

Cost accounting and the Technical Association aroused the chief interest at the 1917 meeting. Most of the papers presented before the Technical meeting were reprinted in the PAPER TRADE JOURNAL, as were the reports of the several cost committees. During the last few months of the year the newsprint investigation and trial of the seven newsprint manufacturers came to its close. Investigation was begun in 1916, at the suggestion of George F. Steele, then secretary of the News-Print Manufacturers' Association. This investigation was prompted by what Mr. Steel regarded as most unjust statements appearing in the press, and the opinions of many members of Congress.

The Trade Commission took up the work of the investigation, which culminated in the indictment of seven manufacturers. These indictments came up for trial, after many postponements, during the Fall of the year. Legal talent on both sides was practically representative of the New York bar. Indicted men were fined $11,000, and the News-Print Manufacturers' Association was dissolved. However, a new association was formed, known as the News Print Service Bureau, with offices in the same place as the old association. Object of the bureau was to act as a statistical organization, and to conserve the interests of the manufacturers, generally.

The first national convention, after the entry of the United States in the war, was held February 7, 1918. It was a critical period, not only in the affairs of the country, but in the industry, as well. Demand for paper had fallen off considerably, due, somewhat, to the campaign to economize, as far as possible. Consumers bought only for immediate needs, and awaited a further break in the market. Government had taken over control of the railroads, and shipments, of raw material to the mills, were held up for many weeks beyond their normal time for reaching consignees.

Because of the need of the Government for all power it could get, some mills, near important power centers, were forced to shut down. Under these conditions, the Government made use of trade associations, and acknowledged their necessity as never before, with the result that manufacturers began to realize the need of belonging to their associations, in order that they receive recognition from the Government. After careful consideration, it was decided that the best way to develop the cost work was to develop a cost section of the American Paper and Pulp Association. It was established November 15, 1917, with B. A. Franklin as president. George W. Sissions was elected president of the Association for 1918, 1919 and 1920.

Cessation of hostilities came at an unexpectedly early period, so far as most people were concerned. Consequently, this probably disturbed business to a greater extent than had the trade been more prepared for the happy event. Because of this reason some paper men, from more or less remote sections of the country, who had not been in the habit of attending conventions, were attracted to the 1919 meeting. This they did to get their bearings, and, by conferring with paper men

G. T. KEYES R. B. MCEWAN CHARLES MCKERSON C. F. SMITH A. H. IVINS E. C. ROBERTSON

G. T. Keyes, Vice President, 1905-06. R. B. McEwan, Vice President, 1905-06. Charles McKernon, Vice President, 1905-06. C. F. Smith, Vice President, 1905-06. A. H. Ivins, Vice President, 1906-08. E. C. Robertson, Vice Pres., 1906-09.

E. P. Lindsay G. M. McKee C. H. Remington H. M. Burnett H. L. Paddock G. F. Steele

E. P. Lindsay, Vice President, 1907-09. G. M. McKee, Vice President, 1907-09. C. H. Remington, Vice President, 1907-09. H. M. Burnett, Vice President, 1908-09. H. L. Paddock, Vice President, 1908-09. G. F. Steele, Vice President, 1909-13.

throughout the country, became better prepared to handle conditions in their particular sections.

Naturally, the war had greatly disturbed economic conditions, and the paper trade, along with other lines, was handicapped in consequence. It was reasonable to expect this, but paper makers suffered more serious inconveniences than they anticipated. Government embargoes and regulations, regarding the varieties of paper that might be manufactured, fuelless Mondays, and the comandeering of plants for the manufacture of ammunition, were only a few of the inconveniences to which they were subject.

However, the paper men were optimistic. A resolution was adopted, advocating the continuation of Government support of the Forest Products Laboratory. As the year wore on, the world-wide shortage of practically all varieties of paper became greatly emphasized. Shortage of supplies was due, largely, to the lack of raw material, and the inability of pulp and paper mill machinery to supply the enormous demands of consumers. Difficulty in getting coal, labor troubles, poor railroad service, and inconveniences caused by the severity of the Winter, increased the paper shortage.

Heavy advertising campaigns of the Summer of 1919, the increased demand for space during November and December, when Christmas advertising was at its height, plus the prosperity felt in all lines of business, stimulated the consumption of paper, and the mills were operating at their maximum capacity. Newsprint shortage caused prices to rise to the point where manufacturers were receiving 9½ cents a pound for spot news, and, on several occasions, bids rose to 13½ and 14 cents.

An unusually large number of paper mills were projected, and numerous going mills were being expanded. These factors caused President Sisson to remark, in his address before the 1920 meeting, that the importance of the paper industry had grown greatly in the public eye. Consumption of paper had never been nearly so large, and manufacturers and distributors found themselves simply overwhelmed by the demands made upon them for supplies.

In spite of the railroad strike, this meeting was well attended, and a spirit of cooperation prevailed. Forestry, taxes, the labor situation, vocational education, trade customs, and cost problems were among the important subjects discussed. New articles of association, with a broader declaration of purposes, were prepared and finally adopted at the annual meeting of 1919, and copies of the articles were distributed at the 1920 meeting. Chief purpose of these articles was to encourage and bring about, wherever possible, the organization of individual manufacturers, in each branch of the industry, into live working associations, and to induce such associations to become members of the American Paper and Pulp Association. Prompted by this declaration, quite a number of groups had been organized during the year. Dr. Hugh S. Baker, dean of the College of Forestry at Syracuse, for a number of years, became secretary-treasurer of the Association.

The 1921 meeting was a gloomy affair. Conditions were completely reversed from those of the preceeding year. Prices had been reduced 50%, and more, in some cases, over the peak prices of the 1919-1920 period. Mills had been forced to curtail production, and to discontinue operations altogether, here and there, because of the great slackening in the demand. While the twelve months since the last annual meeting of the American Paper and Pulp Association had been anything but satisfactory, from a merchandising point of view, they had been decidedly noteworthy, because of the expansions and improvements that had been made in the industry. No 12-month period, up to that time, showed such a long and interesting record of new paper and pulp mills erected, or of increase in the capacities of existing mills.

An innovation at the convention that year was the presenting of a "cross-section" of the entire industry by a number of ten minute speeches by men prominent in the industry. In this way it was possible to grasp the situation throughout the entire paper business, and to visualize it, as a whole. It was possible to demonstrate, through the medium of these short talks, just how each paper product dovetailed with the other, and how all were mutually interdependent. W. J. Raybold, of the B. D. Rising Paper Company, was elected president of the Association.

The very great success of the forty-fifth annual convention of the American Paper and Pulp Association, held during the week of April 10, 1922, at the Waldorf-Astoria, New York, was of special significance, as it marked the first stages of a new cycle of prosperity

m the paper industry. A feeling of optimism and confidence had slowly been gaining ground during the preceeding few months. Sectional meetings played more important rolls than ever in the convention that year. Although their number had increased until they had been expected to be cumbersome and overlapping, the efficient manner, in which the meetings were carried out, made them the center of attraction, and sizeable audiences attended each session.

And 1922 was a year of satisfactory progress and industrial reconstruction. Though not a boom year, production records were shattered in many lines; this came as a result of a steady, substantial demand. Consequently, the attendance at the 1923 meeting was not only the largest in the history of these gatherings, but the interest manifested was most gratifying. W. J. Raybold, who had very creditably filled the office of president, during a period of confusion, retired, and was succeeded by Henry W. Stokes. A new feature of Paper Week, that year, was the Paper Industries Exposition at the Grand Central Palace. This exposition probably did more than any single thing to impress the great importance of the paper industry in this country on those not connected directly with the paper business. Information Service of the Association, which was organized in 1921, was, to a large extent, responsible for this exposition.

A second exposition was held in connection withe the 1924 meeting of the American Pulp and Paper Association. Though it was even more impressive than the first, and aroused considerable interest, it was not repeated. At this meeting Henry W. Stokes was reelected to head the Association for another year. A committee was appointed to act on the subject of unfair foreign paper competition, and to take steps for the protection of the American paper market against the bringing of improperly classified paper into the country. The meeting went on record in favor of the government forestry program, and endorsed the McNary-Clarke bill, our basic federal forest legislation, and has continuously supported adequate appropriations to make this act effective.

The best time for the annual convention was the subject most freely discussed at the February, 1925, meeting. Many were in favor of holding the meetings in February, instead of April, as had been done in 1924. As a result of this discussion, the 1926 meeting was the last to be held in April. The most important features, of this forty-eighth annual convention, was the passing of a resolution protesting against the Canadian export tax, increasing annually upon logs and pulpwood exported from freehold lands in Canada. Norman W. Wilson was elected president of the Association. After much consideration, a change in the method of financing the Association was made at the beginning of the Association's fiscal year, April 1, 1924. This placed the organization on a sounder financial basis than it had been for a number of years, and a moderate reserve in the bank was assured.

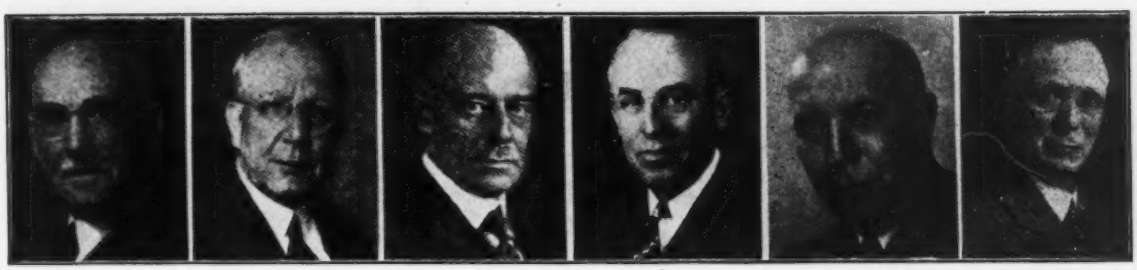
Compared with the previous twelve months in the paper industry, the year 1925 recorded a distinct advance, both in production and in volume of business transacted. On the other hand, competition was so keen and the production was so heavy, that the margin of profit in most sections of the trade, was smaller than it shoud have been. However, when the Association met in 1926, the industry's condition was sounder than for severel years previously, and the outlook was promising. Norman W. Wilson was reelected president. A vote was passed to appoint a committee to consult with the Canadian Pulp and Paper Association on matters of common interest.

Then 1927 marked the Golden Jubilee of the Association. PAPER TRADE JOURNAL issued a souvenir book to commemorate the event. Through loyalty and good management, on the part of its members, the Association had grown with the industry, and had become one of the most representative and efficient trade organizations in the country. Reports of the officers showed that the Association was in a prosperous condition, and that its membership was constantly growing. D. C. Everest, of the Marathon Paper Mills Company, was elected president.

During the year, Dr. Baker resigned as secretary of the Association, in order to accept the management of a new department of the Chamber of Commerce of the United States, known as the Trade Association Department. Major O. M. Porter became acting secretary, and was elected secretary at the 1928 meeting. Dr. D. C. Everest was reelected president at this fifty-first annual convention, and, in an important address, he declared that constructive plans for the development of the Association, suggested by high standing authorities in the industry, made necessary a change in the

A. C. HASTINGS G. W. KNOWLTON W. N. CALDWELL D. S. COWLES F. L. MOORE A. B. DANIELS

A. C. Hastings, President, 1901-03; 1909-14. G. W. Knowlton, President, 1903-05; Vice-President, 1901-03. W. N. Caldwell, President, 1905-07; D. S. Cowles, President, 1907-09; Vice-President, 1905-06. F. L. Moore, President, 1914-16; Vice-President, 1916-18. A. B. Daniels, President, 1916-18; Vice President, 1906-08.



G. W. Sisson, Jr. W. J. Raybold H. W. Stokes N. W. Wilson D. C. Everest S. L. Wilson

G. W. Sisson, Jr., President, 1918-21. W. J. Raybold, President, 1921-23. H. W. Stokes, President, 1923-25; Vice President, 1921-23. N. W. Wilson, President, 1925-27; Vice President, 1923-25; 1933-43. D. C. Everest, President, 1927-29; 1937-40; Vice President, 1925-27; 1933-37; 1940-43. S. L. Wilson, President, 1929-35; Vice President, 1927-29; 1935-38.

form of organization. It was decided to appoint a committee of five, to investigate this matter, and to report either at a special meeting in the Fall, or at the next annual meeting.

Early in the year, the Association had brought into existence a committee on statistics, and, during the year, the statistical service of the Association, under the direction of Paul S. Hanway, functioned as a thoroughly effective service bureau. One phase of this work was the issuance of the Weekly Business Review.

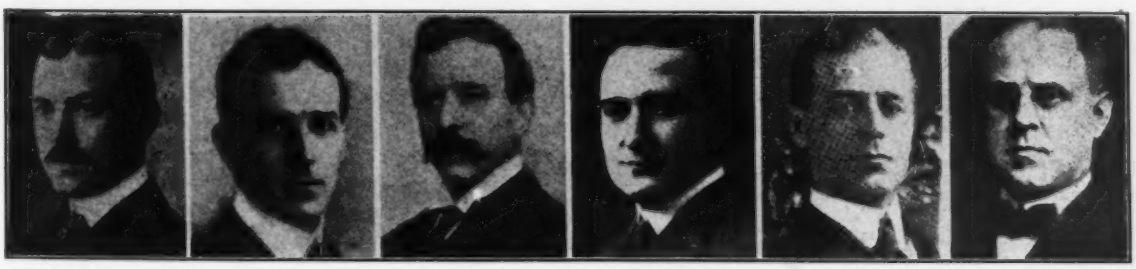
The year had been a very active one, especially in news print, and, as foreshadowed for some time past, Canada definitely surpassed the United States in the production of this variety of paper, and, in fact, established herself as the leading producer of newsprint in the world. Most spectacular development of the year occurred in the Pacific northwest. Potential pulp and paper making possibilities, of this region, had started to be developed almost magically, and competent authorities foretold a brilliant future.

At the 1929 meeting, S. L. Willson, of the American Writing Paper Company, was elected president. The most important feature of this meeting was the report of the committee on development. This committee declared that the Association was not sufficiently representative of the paper industry, not sufficiently manned, nor authoritative enough, or well financed. They declared the fault due to the lack of definite policies and adequate finances, which hampered the carrying out of a full and complete organization. They advocated an organization built around some outstanding man of wide experience, ability, foresight, and vision, with well known executive ability, as general manager. The committee also advocated a traveling secretary, who would both discover the needs of individual members, by personal contact at their plants, and interpret to them the efforts and actions of the general Association in the members' behalf.

Among Secretary Porter's recommendations to the Association that year was that advocating the development of an effective publicity service, under the direction of an experienced newspaper man, in order to give the industry the right kind of publicity, to keep the members fully informed of its activities, and to maintain close contact with government bureaus and departments.

At the meeting, President S. L. Willson announced that Jesse H. Neal had recently been appointed general manager of the Association, in accordance with the recommendation of the reorganization committee. Mr. Neal presented a plan for the establishment of a National Paper Council, to represent the affiliated Associations in directing the organization. Charles W. Boyce was elected secretary of the Association. At this meeting C. C. Heritage presented the first report to the Association, covering the work of the A.P.P.A. Fellowship, instituted at the Forest Products Laboratories July 1, 1929.

In commenting on the conditions in the paper industry for the year, PAPER TRADE JOURNAL stated: "Unusual activity has been in evidence throughout the year in practically every branch of the industry. Consumption of paper also has been greater than ever before in the history of the country. It is apparent, however, that the increase in production has been more rapid than the increase in consumption. This, naturally, has produced an unhealthful situation. It has resulted in a great deal of senseless competition and dissemi-



A. E. Wright A. K. Luke Louis Chable A. G. Maury C. F. Moore A. D. Naylor

A. E. Wright, Secretary-Treasurer, 1903-05. A. K. Luke, Secretary-Treasurer, 1905-07. Louis Chable, Secretary-Treasurer, 1907-10. A. G. Maury, Assistant Secretary-Treasurer, 1911-14; Treasurer, 1914-15. C. F. Moore, Secretary, 1913-14. A. D. Naylor, Secretary-Treasurer, 1915-18.

C. I. McNair | L. M. Alexander | A. H. Nevius | A. L. Pratt | W. D. Randall | Felix Pagenstecher

C. I. McNair, Vice President, 1913-14; Secretary-Treasurer, 1910-12. L. M. Alexander, Vice President, 1917-19. A. H. Nevius, Vice President, 1919-21. A. L. Pratt, Vice President, 1921-23. W. D. Randall, Vice President, 1923-24. F. Pagenstecher, Vice President, 1927-30.

nated profits, that should have been substantial and gratifying when the great activity of the year (1929) is taken into consideration . . . It is obvious that the outstanding cause for the lack of greater profits, in most branches of the industry, during the year, has been lack of intelligent merchandising, just as it has been for so may years in the past."

While volume of business, transacted during the first half of 1930, was satisfactory, there was a decided slump in the latter half of the year. Production of paper decreased approximately nine per cent below 1929, while consumption fell off about ten per cent. Value of exports had dropped eighteen per cent. However, paper had not suffered as severely as other basic industries, and there was a decided feeling of hopefulness at the 1931 meeting.

Sidney L. Wilson was reelected for a third term, in order to complete the program of reconstruction, which had begun the previous year. In his address before the Association, President Wilson pointed out that manufacturers, during the preceeding fifteen years, had given much thought to the problems of cost, and great progress had been made in that direction, but, the distribution problem had been neglected, to some extent.

Under the managership of Jesse H. Neil, the er-organization program had been carried into effect, as far as possible, under the existing economic conditions. The Association took over the Cost Association, and made it the cost department of the organization, and provided for its maintenance from the Association's budget. The old Woodlands section, which had been financed largely from separate contributions, became the pulpwood department. The waste utilization and stream purification committee abandoned its separate appeal for funds, and became the engineering department.

While putting these changes into effect, the regular work was not only maintained, but stepped up and intensified, to meet the increasing demands for service, resulting from the abnormal business situation. With the expansion of the services of the Association, it was found that quarters were inadequate. Headquarters of the Association were moved to present location in the Channin Building, New York.

The industry met in a spirit of cooperation in 1932. Though the depression was now being felt, it was still not as marked as it was in other basic industries.

John C. Kavanagh, director of the statistical department, in his report to the meeting, stated: "The process of liquidation has taught the paper industry several valuable lessons, the foremost of which is the necessity for wider and cheaper distribution. Production technique has progressed too rapidly for the methods of distribution, and greater efforts are needed to bring marketing methods to a point which will be less costly to the industry, and more effective in allocating the mass production to the proper consuming centers."

Sidney L. Wilson was reelected to serve his fifth year as president of the Association at the 1933 meeting. Because of the general economic conditions, the income of the Association was cut almost in half, but, in spite of the decreased income, the deficit, which had existed at the previous meeting, was about wiped out. In spite of inadequate funds, all staff services had been maintained, with the exception of the cost

M. E. Marcuse | W. M. Crane, Jr. | W. L. Carter | G. H. Mead | H. W. Ellerton | A. R. Graustein

M. E. Marcuse, Vice President, 1929-31. W. M. Crane, Jr. (Photo by Bachrach), Vice President, 1930-31. W. L. Carter, Vice President, 1931-33. G. H. Mead, Pres., 1942-43; Vice President, 1931-32; 1933-35. H. W. Ellerson, Vice President, 1933-36. A. R. Graustein, Vice President, 1933-36.

J. D. Zellerbach | H. J. Chisholm | S. B. Copeland | J. R. Miller | R. J. Cullen | Z. W. Ranck

J. D. Zellerbach, Vice President, 1933-43. H. J. Chisholm, Vice President, 1934-47. S. B. Copeland, Vice President, 1934-40. J. R. Miller, Vice President, 1935-44. R. J. Cullen, Vice President, 1936-43. Z. W. Ranck, Vice President, 1936-38.

work. The Weekly Business Review was discontinued, and, in its stead, a new publication, the Monthly Review, was started.

Enactment of the national recovery act put new life into the industry. In his address before the 1934 meeting, President S. L. Wilson, summarized what the NRA had done for the paper industry as follows: "It has enabled the industry to build up an Association that was disintegrating, and which now represents nearly every mill in the country, and, to prompt their support in financing it. It has enabled the industry to increase the number of those employed by 22%. It has increased pay-rolls at the rate of $70,000,000 per year through increased wage rates and employment. It has developed cooperation between competitors, and eliminated jungle competition. It prevents selling below cost, and it has rersulted in the standardization of grades and prices. It has been the means of getting those engaged in the industry to study their cost and merchandising problems, and to reestablish trade customs and trade practices, which had long been violated or ignored." Trend of the paper industry was upward, with practically all grades taking part in the movement. Outlook for the future was decidedly promising.

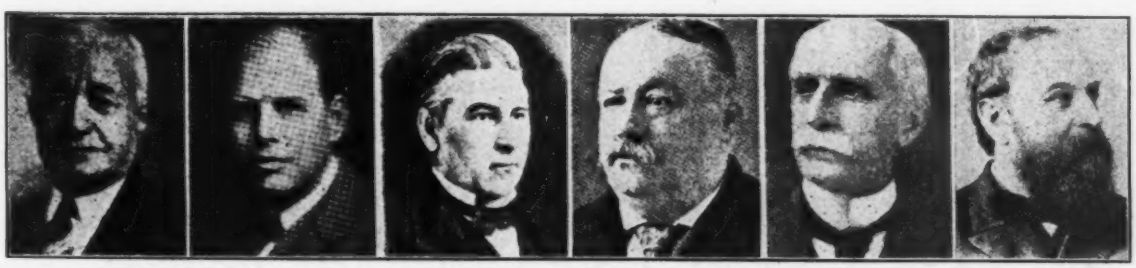
There was a record attendance at the fifty-eighth annual meeting in 1935, at which F. J. Sensenbrenner, of Kimberly-Clark Corporation, was elected president. Great progress had been made, during the preceeding year. toward stability. Price structure was firmer, and cut-throat competition had been eliminated. Stocks at the mills and in merchant's warehouses were below normal, and the demand was increasing. Outlook was decidedly encouraging.

A good year for the paper and pulp industry was predicted for 1936 in the Monthly Review of the American Paper and Pulp Association. Now that the industry was organized, it had more basic information for use in determining its policies. It had a real opportunity to take advantage of the possibilities of greater volume of trade, without creating a mass of new capacity, prior to its actual need.

Chief problem of the industry was to balance its production possibilities against its consumption possibilities. A comparative reporting service was approved by the Association July 12, 1935. The first preliminary comparative statement was gotten out in August, covering the conversion cost per hour of operating 50 paper machines. The service was made available for any paper and pulp company at $25 per month for any or all of the reports in which it participated

And 1936 was a good year. Great progress was made towards stability. The price structure was decidedly firmer, and cut-throat competition had been practically eliminated. Paper production in the United States amounted to 11,843,000 tons, a new high level for all time. When the sixtieth annual meeting of the Association was held the week of February 22, 1937, the outlook for the paper industry was considered exceedingly bright. During the preceding year, the central grading committee was superseded by the technical committee, the latter broader in its conception. This committee was responsible for the instrumentation studies, all of which were, and still are, being published in Paper Trade Journal. D. Clark Everest was elected president.

The 1938 meeting was largely attended, with guests from other countries present. D. Clark Everest was re-



F. J. Sensenbrenner | J. L. Riegel | A. E. Harding | C. D. Brown | J. A. Kimberly | C. M. Smith

F. J. Sensenbrenner, President, 1935-37; Vice President, 1915-17; 1934-35; 1937-40. J. L. Riegel, Presiednt, 1940-41; Vice President, 1934-40, 1942-43. A. E. Harding, Vice President, 1882-83. C. D. Brown, Vice President, 1884-91; 1898-91. J. A. Kimberly, Vice President, 1884-85; 1890-91. C. M. Smith, Vice President, 1884-90.

R. A. Hayward W. H. Anders D. K. Brown R. K. Ferguson W. B. Merlin W. I. Osborne, Jr.

R. A. Hayward, Vice President, 1937-41. W. H. Anders, (Photo by Blank & Stoller) Vice President, 1938-40. D. K. Brown, Pres. 1944-45; Vice President, 1939-43; 1946-47. R. K. Ferguson, (Photo by Jenkins &Guillo, Inc.) Vice President, 1939-41; 1944-47. W. B. Merlin, Vice President, 1940-41. W. I. Osborne, Jr., 1940-41.

elected president. Total production of all grades of paper broke all records in 1937, and established a new high output of 12,600,000 tons. For the first five months of 1937, the industry, as a whole, operated at over 90 per cent of capacity, in contrast to the drastic decline in the fourth quarter, when operating ratio for the whole industry dropped, in December, to 55 per cent of capacity. At the close of the year, prices were below the January levels, but, during the decline, no sharp breaks occurred, such as had been present in losses of volume in the past. Expectations for 1938 were for less volume, in the first half of the year, with the last half well in excess of 1937.

However, at the 1939 meeting, at which D. Clark Everest was again relected president, a drop of 12 per cent in the production ratio was reported. The industry was in a jittery state, due, largely, to threatened war in Europe.

The 1939 production of paper reached a new high record of 13,441,000 tons. Capacity of the paper industry and its actual production was more than twice that of twenty years ago. The 1940 meeting marked the 250th anniversary of the paper industry in America, and the sixty-third year of the Association. John L. Riegel succeeded D. Clark Everest as president. The flood of orders, the pyramid of production, preventing run-away prices and excessive speculations, were the problems which faced the industry, due to the outbreak of the Second World War. E. W. Tinker, former United States assistant chief forester, succeeded Charles W. Royce as executive secretary of the Association.

In place of the usual afternoon meeting, during the convention week, at which reports were presented and addresses were made, a special luncheon meeting was held in 1941. The Association was on a sound financial basis. President Riegel reported a safe working balance, with a reserve of $20,000 in Government bonds, and about the same amount in cash. A recommendation was made for a slash in assessment rate, from 46 cents in 1940 to 39 cents in 1941 per thousand dollars of sales.

The sixty-fifth annual convention of the American Paper and Pulp Association, and its numerous affiliated organizations, was held February 15-20, 1942. Leading event of the opening session was the Association luncheon, with addresses by J. L. Riegel, R. L. Weldon, J. R. Kiberly, and R. B. Robertson, Sr. J. L. Riegel retired, and was succeeded by George H. Mead as president of the Association.

The entrance of the United States in the war had brought about greater consolidation of the industry. Many companies, which previously insisted on complete independence of action, had become active members of divisions. Several branches of the industry, which were not part of the American Paper and Pulp Association, had applied for membership. The Association, itself, had been principally concerned with industry planning, particularly as it related to a successful prosecution of the war.

In his annual address, President Riegel stated, "We can all be proud of the results achieved. I am certain that the result would have been different and less satisfactory if the Government planning had not had the assistance of many individuals from the industry, serving the Government officially and unofficially, to-

C. G. Parker Vertrees Young G. W. Wheelwright D. P. Crocker W. H. Parsons, Jr. C. W. Lyman

C. G. Parker, Vice President, 1940-47. Vertrees Young, Vice President, 1940-41. G. W. Wheelwright, Treasurer, 1889-93. D. P. Crocker, Secretary-Treasurer, 1883-86. W. H. Parsons, Jr., Secretary-Treasurer, 1896-97. C. W. Lyman, Secretary-Treasurer, 1897-99.

gether with the help of the many industry committees"

The 1943 meeting was given over largely to the industry's participation in the war effort. George H. Mead was reelected president.

At the 1944 meeting, D. K. Brown, president of Neenah Paper Company, was elected to head the Association. This meeting was not a convention, in the true sense of the word, but, rather, a conference of representatives of the industry, to determine what steps should be taken to further assist the Government in winning the war. In his annual address, George H. Mead summarized the situation as follows: "The paper industry, I am proud to say, enlisted for the duration when this country entered the war. We have backed the attack with increased efficiency in operation, the highest technical experience, and loans of our brilliant top-flight executives to Government agencies, without regard for individual or company benefits or sacrifices.

"No industry has more whole-heartedly cooperated with every Government effort, and this spirit of service to the nation is fully recognized at Washington. On behalf of the American Paper and Pulp Association, and its constituent divisional Associations, I pledge our Government the continuance of this support until the struggle is ended.

"Without the paper produced by this industry, the war could not continue for twenty-four hours. Paper is vital to the war effort, in many ways. It is essential for direct war purposes. It is an essential commodity for those industries which are producing war weapons and equipment. It is essential for the every-day requirements of the civilian population, if we are to have the morale at home which means so much in maintaining military operations and industrial production at high level.

"Despite the tremendous drains on the industry's resources, to produce the paper needed by the nation, it has been able to maintain a high rate of production. War requirements, added to civilian needs, have caused an unprecedented demand for our product. The wonder is not that there is a shortage—but that the stringency is not more severe.

"For two years preceding actual entry into the war, the nation, was perparing for an emergency which might develop. Today, we are in the midst of actual war, but the paper industry is alert to the necessity to plan now for the post war era. While we are giving our utmost to the war effort, we are devoting, and must continue to devote, the most intensive study to post-war problems—to perfect our preparedness for peace.

At the request of the office of defense transportation, the 1945 convention of the American Paper and Pulp Association was cancelled. As a result, the activities of Paper Week were confined to essential committee meetings. Due to the critical situation, which had developed, the industry had received considerable free publicity from the public press and radio, which helped to create a public consciousness and appreciation of the value and importance of paper, both in war and peace. In order to capitalize on this publicity, and maintain and develop the position of the industry, a public relations counsel was employed by the association.

Annual Paper Week program was resumed in 1946. Reuben B. Robertson, of Champion Paper and Fibre Company, was elected president. The pulp and paper industry's chief problems revolved around Government control and reconversion. Though labor problems were confronting most other enterprises, this, the sixth largest of the nation's industries, was almost entirely free of strikes and labor stoppages, according to a report made by E. G. Amos, secretary of the industrial relations committee of the American Paper and Pulp Association.

Despite the limitations in machinery, equipment, supplies, raw materials, and labor, the paper industry, in 1946, produced 19,157,000 tons, an all time record. But the demand is still greater than the supply. The industry has come a long way; it has emerged from World War II with the essentiality of paper definitely proven. Tremendous growth of the industry is due, largely, to the services of the American Paper and Pulp Association, and its continued progress depends on the cooperation of the various divisions and their members in the Association.

Appreciation of the important role played by the associations in the advancement of any industry, and, more specifically, in helping the member firms and the individual officers in each firm, is not always as widely appreciated as it might be.

It is reasssuring to any one confronted with a busi-

H. P. Baker O. M. Porter J. H. Neal C. W. Boyce E. W. Tinker

H. P. Baker, Secretary-Treasurer, 1920-28. O. M. Porter, Secretary-Treasurer, 1928-29; Assistant Secretary, 1934-35. J. H. Neal, General Manager-Treasurer, 1930-32. C. W. Boyce, Secretary, 1930-40; Assistant Secretary-Treasurer, 1929-30. E. W. Tinker, Secretary, 1940-47.

GEO. R. WALLACE
Vice Pres., 1944-47

P. H. GLATFELTER
Vice Pres., 1942-47

DONALD S. LESLIE
Vice Pres., 1944-47

FREDRIC G. COBURN
Vice Pres., 1947

R. A. McDONALD
Vice Pres., 1944-47

JOHN H. HINMAN
Vice Pres., 1944-47

ness problem to know that, to some extent, its quick and successful solution may hinge on securing promptly information which is only available through association channels. "United we stand, divided we fall," is one of the corner stones of democracy which has made America great. The same principle, carried into associational thinking, has brought the members of our industry together, secure in the knowledge that, through the interchange of ideas and experience, immediate good is accomplished, and accumulative reserves are piled up which prove to be of increasing use to the conduct of the business of every month and every year.

The paper industry is exceedingly fortunate in having the American Paper and Pulp Association and its affiliated organizations. It is doubly fortunate that all the specialized organizations in the industry have seen the wisdom of combining their efforts, so that what benefits one can benefit all. Out of the more than eleven hundred associations of manufacturers listed by the Department of Commerce in its Catalog of Trade and Professional Associations of the United States, the American Paper and Pulp Association ranks definitely among the outstanding leaders in a number of important respects: (1) the number and caliber of the members. (2) the thoroughness with which all phases of scientific development, manufacturing and marketing are treated. (3) the volume of national services originated, developed and completed by the Association through the skillful work of its staff, and the self-sacrificing, public spirited and indefatigable efforts of its individual members.

JAS. L. MADDEN
Vice Pres., 1942-3-5-7

REUBEN B. ROBERTSON
President, 1946-47

It is difficult to name any firm of any consequence in any branch of the paper industry which is not a member of one or more of the various associations affiliated with the national organization.

The following are divisional associations of the American Paper and Paper Association:—Blotting Paper Manufacturers Association, Book Paper Manufacturers Association, Bristol Board Manufacturers Group, Cardboard Manufacturers Association, Fibre Board Manufacturers Association, Glassine and Greaseproof Manufacturers Association, Groundwood Paper Manufacturers Association, Kraft Paper Association, Paper Shipping Sack Manufacturers' Association, Soda Pulp Manufacturers Association, Specialty Paper and Board Affiliates, Sulphite Paper Manufacturers Association, Tissue Association, U. S. Pulp Producers Association, Writing Paper Manufacturers Association. Its associated members are the American Waxed Paper Association and the Glazed and Fancy Paper Association. Among its affiliated members are the American Pulp and Paper Mill Superintendents Association, Inc., Pulp and Paper Traffic League, Salesmen's Association of the Paper Industry, the Technical Association of the Pulp and Paper Industry and the News Print Service Bureau.

ROBERT F. NELSON
Vice Pres., 1944

JOHN D. ZINK
Vice Pres., 1945

FOLKE BECKER
Vice Pres., 1944

ROBERT R. WOLF
Vice Pres., 1944-46

NORMAN S. STONE
Vice Pres., 1942-43

DWIGHT L. STOCKER
Vice Pres., 1942-47

CHAPTER XXX

Technical Association of the Pulp and Paper Industry

About the turn of the century the pulp and paper industry was becoming aware that, if it wanted to compete with other nations, it would be necessary to overcome its wastefull methods by the development of the technical side of the industry, as the great advantages of abundant and cheap raw materials, which it had hitherto enjoyed, could no longer be relied upon. Leading companies in the industry manifested their interest in the technical side by the establishment of laboratories, not only for the testing of raw materials, which they bought in the open market, but, also for the testing of formula of their various processes, chemical, as well as mechanical.

To bring together these forces, which related to the technical side of the industry, a preliminary meeting for organization of the Technical Section of the American Paper and Pulp Association was held February 18, 1915 at the annual meeting of the A.P.P.A., and the actual organization was effected in Chicago, Illinois, May 6, 1915. First general meeting was held in Grand Central Palace, New York City, September 23, 1915, at which time a constitution was adopted. Objects of the section, as stated in the constitution, were: (*1*) to stimulate interest in the science of pulp- and papermaking; (*2*) to provide means for the interchange of ideas among its members; (*3*) to encourage original investigation. They were three excellent plans.

Organization committee consisted of Henry E. Fletcher, W. G. MacNaughton, Ernst Mahler, Charles F. Rhodes, Henry F. Obermanns, Ralph H. McKee and Thomas J. Keenan.

At the first annual meeting held February 16-17, 1916, the articles of organization were revised, and the name of the organization was changed to the Technical Association of the Pulp and Paper Industry. It became an independent association, absolutely distinct in its administration.

Growth in membership and service, to the pulp and paper industries, has fully justified the initiative and labors of the founders. From a membership of 201 in 1915, TAPPI has grown to a total individual membership, as of December 31, 1946, of 2,768. From small discussion groups TAPPI has grown so that the national conventions are divided in sessions dealing with the various phases of the industry, covering a multiplicity of subjects, each presented by a specialtist, and then discussed in open forum.

W. F. GILLESPIE
President of TAPPI

Up to 1946, two national conventions were held each year, the annual meeting in February, in conjunction with the meeting of the American Paper and Pulp Association, during Paper Week in New York; and the Fall meeting, held in various papermaking centers in the Fall. In 1946, due to the difficulty of obtaining hotel accommodations, the Association took advantage of the opportunity to experiment with a new convention service, namely, that of conducting three Fall meetings of specialized interest that were attractive to certain specialists.

Although the scope of each meeting was limited, there was as much time devoted to each as would normally have been devoted to a general Fall meeting. The experiment was so successful that the plans for 1947 are to extend these meetings to five. It is felt that the holding of a number of Fall regional meetings in papermaking centers, under the auspices of one or more committees, would strengthen the committees and sections; would provide the opportunity for more members, particularly the younger men, to attend and develop leadership, while still retaining the desirable feature of mill visitations.

The TAPPI meetings provide means for the interchange of ideas and information for the advancement of the science of pulp and paper manufacture. Approximately 100 papers were delivered at the 1947 annual meeting. Practically all of the papers delivered at the annual and Fall meetings of the Technical Association are printed in PAPER TRADE JOURNAL, which was selected by the organization in 1921 as the medium for the dissemination of the findings of its members. This arrangement has been in effect without a break since that time. The secretary of the association acts as editor of the TAPPI section in the weekly issues of PAPER TRADE JOURNAL.

As TAPPI grew larger, and its value became more apparent, the need for regional activities was solved by the formation of local

sections. Local groups are given a charter by TAPPI when they have shown their stability to function under their own leadership. There are now ten such local sections. They are the Pacific Section, organized in 1929; the Lake States Section, organized in 1930; the Delaware Valley Section, organized in 1931; the Kalamazoo Valley Section, organized in 1931; the New England Section, organized in 1932; the Ohio Section, chartered in 1938, the Maine-New Hampshire Section, organized in 1940, receiving its charter in 1945; Papermakers and Associates of Southern California, organized in 1941; and the TAPPI Chicago Section, organized in 1943, received its charter in 1946.

Committee organization constitutes the principal means within the Association for the collecting and dissemination of technical knowledge, either by codification of existing knowledge for easy use and reference, or by the planned production of new knowledge. Service in the committee organization is entirely voluntary, and without financial remuneration. It is based on the advantages to all members and the industry which results from the planned joint efforts of many individuals.

Insofar as possible, appointments to a committee are made of individuals whose vocational activities come under the scope of that committee. There are seven major divisions, namely, Engineering, Industrial, Pulp Manufacture, Paper Manufacture, Testing, Converting and Consuming, and Research Development. Each division is made up of appropriate committees, and these are frequently divided into subcommittees to do special work. The entire divisional organization is under the administrative direction of the vice president, who works directly with the division chairman and the secretary. Division chairman work with committee chairman, who select the members of their committees and subcommittees. Several of the committees are made up of members located geographically near the chairman. This provides for effective prosecution of the work through more frequent meetings. In several cases this committee is supplemented by an advisory committee, made up of members particularly qualified in the field served by the committee, but more widely dispersed geographically.

Any member may submit problems relating to pulp, paper, and paperboard manufacture to the secretary of the Association. The Association's files contain a vast fund of information, and, in addition, members have been found to be generous in giving helpful information to those especially requesting it.

When the nature of the problem is such that no one answer will suffice, a copy of it is sent to the entire membership, and a transcript, in blank, of the replies received, is sent to all who reply, and to the corporate members.

Insofar as possible, the Association makes an earnest effort to keep members employed. To this end unemployed members are notified of positions open, and companies, desiring men of particular qualifications, can be put in touch wtih them through the secretary's office. A large number of individuals have been able to obtain employment through the agency of the Association. In no case are fees charged for this service.

Bibliograph and U. S. Patent list, a separate volume listing the articles published and patents granted for the preceding year, has been published yearly since 1932, and issued to members.

Technical Association Papers, a volume consisting of the papers and transactions of the annual and Fall meetings, and information about the Association, is issued annually. The first volume of Technical Association Papers was published in 1918, and consisted of 64 pages. In 1935, the binding was changed to cloth, for greater durability and better appearance. The latest volume of Technical Association Papers, Series 29, 1946, contains 824 pages of scientific articles, addresses, reports of committees, and other useful matter.

The Year Book, which contains a list of members and information about the Association, has been issued annually since 1932.

TAPPI Standards is a loose-leaf manual containing all the tentative and official testing methods, recommended practices, and specifications of the Association. New and revised standards are sent as issued to all members in good standing.

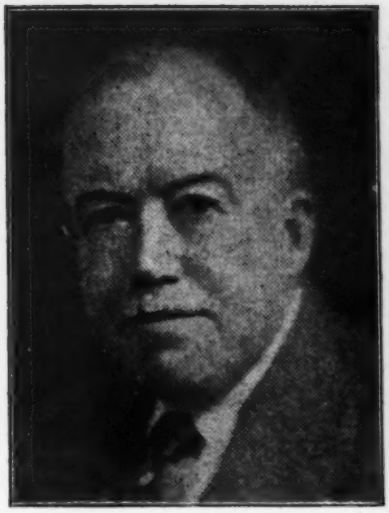
In 1939, TAPPI began the issuance of the TAPPI Data Sheets, a loose-leaf series of technical sheets, sent to all members annually. Because most engineering handbooks do not contain much engineering, chemical, or other data primarily applicable to the pulp and paper industry, these sheets are issued to fill the voids.

Paper Trade Journal, a weekly containing the TAPPI section, devoted to papers presented at national and local meetings and contributed articles, is included in the membership dues. Outside the technical section other material of general interest, as news, market, construction, financial, and other reports are published.

Textbooks on the Manufacture of Pulp and Paper, issued by the McGraw-Hill Publishing Company for the Joint Textbook Committee, are being revised. A large number of Association members are assisting in this work. It is planned to issue four new volumes, to succeed Volumes III, IV, and V of the former set. The first two volumes of that set will not be included in the new one. The Joint Textbook Committee represents both TAPPI and the Technical Section of the Canadian Pulp and Paper Association.

Vocational Training for the Pulp and Paper Industry, a job analysis, with suggestions in the organization and operation of training programs, is a paper-bound volume prepared through the joint efforts of the TAPPI Education Committee and the Federal Board for Vocational Education. (Bulletin 168, Trade and Industrial Series 49). It was published in 1933.

Two monographs, Industrial Water in the Pulp,



T. J. KEENAN
Secretary, TAPPI, 1915-1921

R. G. MACDONALD
Secretary, TAPPI, 1927 to Date

W. G. MCNAUGHTON
TAPPI Secretary, 1922-1927

Secretaries of Technical Association of the Pulp and Paper Industry

Paper and Paperboard Industry, and Saving Fourdrinier Wires, were published in 1942. One monograph, "Starch for Paper Coating" was issued late in 1946, and one on Pulpwood Stands, Procurements and Wood Utilization, neared completion.

A news publication, the TAPPI Bulletin, is published periodically. It covers current technological developments.

TAPPI Papermaking Abstracts, containing abstracts of patents and articles from publications throughout the entire world, is published periodically.

As a recognition of extraordinary achievements, definitely contributing to the scientific and technical progress of the pulp and paper industry, the Association has awarded fifteen gold medals since 1928. This award is known as the TAPPI Medal Award. The recipients were: William H. Mason 1928 (deceased), Ogden Minton—1928 (deceased), Ernst Mahler—1933, Edwin Sutermeister—1935, William H. Millspaugh—1936, Clarence J. West—1937, Carl B. Thorne—1938 (deceased), J. Newell Stehenson—1939, Otto Kress — 1940, Robert B. Wolf — 1942, Harry Fletcher—1943, D. Clark Everest—1944, Bourdon W. Scribner—1945, William G. MacNaughton—1946, and Peter J. Massey—1947.

As in the first World War, TAPPI was outstanding in its support of the war production program during World War II, and, for this service, was awarded the Navy's Certificate of Achievement. There was hardly a branch of the armed services which did not avail itself of the fund of information collected over the years by the Association. The TAPPI Standards were adopted unchanged by our armed forces and those of our allies.

Growth and achievements of TAPPI, during its thirty-two years of existence, have been phenominal. Its value to the industry is recognized throughout the world, and its membership includes the five continents.

CHAPTER XXXI

Oldest Trade Association Is Writing Paper Manufacturers

THE Writing Paper Manufacturers Association can be justly proud of itself for many reasons. It is the oldest *paper* trade association in the United States, as well as the oldest national trade association of any kind in this country.

The original group, which established the Writing Paper Manufacturers Association, was composed of 21 fine paper mills. These organizers met at Pittsfield, Massachusetts, February 13, 1861, and drew up the constitution which the Writing Paper Association preserves today as an historical document.

Not too much is known of the background of all of the original organizers of the Association. Harrison Garfield was its first president. Of the original companies which organized the Association in 1861, three are still members: Carew Manufacturing Company, Parsons Paper Company, and Southworth Company. In addition, the original list included Agawam Paper Company and Platner & Porter Manufacturing Company, forebearers of the American Writing Paper Corporation.

The other original signers were D. Carson & Company, Chaffee & Hamblin, Carson Brothers, May & Rogers, E. H. Owen, Brown & Hale, Benton & Garfield, Platner & Smith, South Lee Manufacturing Company, Thomas Colt, Greenleaf & Taylor Manufacturing Company, Chapin & Gould, Laflin Bros., Prentiss C. Baird, Nyasset Paper Company and Jessup & Laflin.

Times really have changed since the first constitution was adopted. In 1861, dues were $2 per year. Any additional expenses were met by a tax levied upon the members —"such tax not to exceed in any one year $2 per engine."

The constitution of the Association stated, amongst other things, that one power of the executive committee was to determine to what extent paper manufacturing should be reduced or decreased, and how long such reduction or increase would continue. It should be remembered that, in those days, there were no Federal anti-trust laws.

The first communication of the Association, which still is in the possession of the Writing Paper Associations today, was dated November 17, 1875, signed by William Whiting, as chairman of a committee. Mr. Whiting was the father of the late William Whiting, Secretary of Commerce in the Coolidge cabinet, and grandfather to the present Whitings in business today. The committee pointed out that a meeting of writing paper manufacturers had been held because the writing paper market was declining. In order to relieve a very poor profit situation, the committee recommended that buyers make an immediate advance in the prices of writing paper. In addition, they agreed to materially curtail production during the year 1876, and to advance their selling prices about 10%. Mills were to be entirely shut down from at least December 15, 1875 to January 17, 1876. Text of the committee's decision and plea is here, together with a later, more personal request by one of the members.

M. D. BARDEEN
President, Writing Paper Association

At the time of these activities of the early Association it was legally proper to engage in them. But, since the enactment of the Sherman anti-trust act in 1890, the Association's efforts have, of course, been strictly confined to the collection and dissemination of statistics, economic data and other aids to business, which are well within the law.

November 17, 1875.

"*To Buyers of Writing Paper:* The manufacturers of this class of goods, appreciating the condition of trade in their line, and the difficulty there is, on a declining market, in obtaining a profit for either Manufacturer or Jobber, have this day held a meeting which was quite largely atended. They determined, if they could secure the consent of all the manufacturers of all classes of these goods, *to materially curtail the production for the year 1876,* and to meet the enhanced cost of the goods by the short production, *to advance prices some ten cent, the latter to go into effect at once.* The project is to shut the mills down entirely from December 15 and January 17, and in January to again meet and determine whether to start up on *half-time,* or on full-time, and again at a later day shut down.

"The undersigned were appointed a Committee to determine the date of the next meeting, to secure the consent of those manufacturers who were not present

at the meeting to listen to all complaints from such members of our association as feel aggrieved by the action of brother members, to adjust such questions as may arise from difference of situation and circumstances, and to do and cause to be done, all they possibly can to promote the interests of the business which has so long been in a suffering condition.

"To this end we look to the buyers for help and cooperation. We believe that you can help by recognizing the necessity for this action and governing yourselves accordingly. First, by immediately advancing the prices of your goods on hand in our line.

"Secondly, by demanding a larger margin for profits.

"Thirdly, by shortening time of credits, and lastly by *believing* that we are thoroughly in earnest, that we have not entered upon this business for a day or a month, but to place our affairs on a firm foundation where we can hope for small but sure returns for our labors, and at the same time establish prices that will enable those who carry large stocks of these goods to go to their homes at night, confident in the value of their property.

"The business needs a stability which it has never yet had, and which we believe can only be accomplished by this course.

"May we not rely on your aid to attain the desired end?

Respectfully Yours,
Wm. Whiting,
C. O. Chapin,
H. C. Hurlbut,
G. B. Holbrook,
J. H. Appleton,
Committee."

* * *

Letter from a private in the writing division of the American Paper Makers Association:

Office of Platner & Porter
Manufacturing Company,
Unionville, Connecticut, December 15, 1884

"The modesty of the request of our worthy Secretary, December 13th, for the December shut down, and the sneer of a Springfield correspondent in one of the Trade Papers, to the effect that the shut down would amount to nothing, because the manufacturers would not act in good faith, leads to this suggestion from the ranks:

"The driver of any establishment, be it a mule-train or a Paper Mill, is more graceful, and appears to better advantage upon the seat, with the reins well in hand, and his team under control, than when under the wheels or dragged at the tail of the cart.

"Believing in the good faith of our members, in the sterling good sense of our guild, and in our ability to master the situation, I suggest that every member, whether full of orders or not, wrtie immediately to our Secretary, stating with no uncertain sound, his intention to comply with the shut down in good faith, and his belief in the wisdom and feasability of restricting production.

"The Book Mills already see their mistake. By faithful and united action let us avoid a similar one.

"Apologizing for this intrusion, and wishing you, gentlemen, each and every one, a Prosperous and Happy New Year for 1885, I am,

Yours Very Respectfully,
E. B. Ripley."

M. C. DOBROW
Writing Paper Association
Executive Secretary and Treasurer

History of the Writing Paper Manufacturers Association may logically be divided into two periods—the first, from 1861 to 1914, and the other from 1914 to the present time. During the first period, the Association operated without the services of a paid executive. In 1914, it obtained the services of an executive secretary, to better coordinate its activities. E. H. Naylor was the first executive secretary, and remained in that position for 24 years, until his resignation in February, 1938. M. C. Dobrow, the present executive secretary, succeeded Mr. Naylor. Mr. Dobrow has served in paper industry trade association activities for over 30 years, and was treasurer and assistant-secretary prior to assuming his present duties.

In addition to serving as a clearing house for industry statistics and economic data, the Writing Paper Association engages in numerous other special projects. For example, the Association has been sponsoring the use of government subsidized cotton in rag content paper mills. Without this needed raw material, many rag content mills would have operated on short time, especially during the latter part of the war, due to a shortage of suitable papermaking cotton cuttings.

As a direct result of the initial efforts of the Association, a substantial group of rag content paper mills currently is investigating the prospects of growing cotton for use by paper mills.

From time to time, the Association has conducted cost surveys on specified phases of papermaking operations. These surveys indicate to many participants those cost factors which may be too high. The Association recently has completed such surveys on finishing and packing operations, covering sulphite bonds, rag content papers, cover papers and bristols.

From time to time, the Association is called upon to cooperate with the United States Secret Service, the FBI and other government agencies, to identify, for example, the manufacturer of a particular paper which has been used for counterfeiting purposes or ransom notes.

Shortly after 1914, the Association commenced compiling brands and watermarks applicable to fine papers. At present, the Association has over 35,000 brands and watermarks listed in its files, of which about 5,000 are registered with the United States Patent Office. This file is used, not only by paper manufacturers, but, also, by merchants and others in order to determine if someone else is using a desired watermark, and for the purpose of recording basic information concerning such marks. In view of the new Lanham act, applicable to trade-marks, this service of the Association is expected to be of increased value.

Exports of fine papers, falling within the Writing Paper Association, are a substantial market outlet for many of the members of the Association. At the request of the Association, the United States Department of Commerce recently conducted a survey of foreign markets for specified fine papers, obtaining the information from State Department offices throughout the world. These surveys are furnished the members of the Association shortly after their receipt by the government.

Other activities, carried on by the Association, include financial surveys, papermaking capacity studies, and analyses of cotton fiber and wood pulp supply.

The Association is composed of five groups: Sulphite Bond Group, Rag Content Group, Bristol Board Group, Cover and Text Paper Group, and Thin Paper Group. In addition, there are other active groups, such as the Purchasing Agents' Committee and the Fiber Research Committee.

Past presidents of the Association include Harrison Garfield, William Whiting, O. H. Greenleaf, B. D. Rising, H. A. Gould, C. M. Burnett, A. W. Esleeck, W. D. Judd, C. A. Crocker, A. B. Daniels, J. G Taylor, W. J. Raybold, N. W. Wilson, Philip Weston, W. M. Crane, Jr., D. K. Brown, B. A. Franklin, H. R. Baldwin, I. N. Esleeck, R. S. Madden, A. C. Gilbert, J. D. Zink and H. H. Hanson.

Present officers of the Association are: M. D. Bardeen, president; H. V. Burgee, vice president; W. B. Zimmerman, vice president; and M. C. Dobrow, executive secretary and treasurer.

National Paper Trade Association

On invitation of the Paper Association of New York City, the organization meeting of the National Paper Trade Association was held in the Dunn Building, 290 Broadway, New York, December 15, 1903. The organization committee elected at this meeting consisted of E. U. Kimbark, A. F. Peck, W. F. McQuillen, Gordon F. Reese and J. E. Linde. The following officers were elected: O. A. Miller, president; W. F. McQuillen, vice-president; J. E. Linde, secretary; and Gordon L. Reese, treasurer.

First annual meeting, which was held at the Waldorf-Astoria Hotel, February 9, 1904, was attended by delegates from the following five local associations: The Paper Association of New York City, Western Paper Dealers Association, Central States Paper Dealers Association, Northwestern Paper Dealers Association and the Boston Paper Jobbers Association. Robert Johnston, Norfolk, Virginia, was present as a representative of a proposed organization of southern dealers. Total membership of these locals amounted to 116. At this meeting the permanent organization was completed by the adoption of a constitution and by-laws. Objects of the organization, as stated in the constitution, were: "It shall be the purpose of this Association to improve and regulate the business dealings of its members with their customers, as well as with the manufacturers, and put them upon a fair, equitable basis for all concerned." This section was subsequently amended to read; "It shall be the purpose of this Association to foster and promote the best interests of the paper trade."

A. W. TOWNE
President of the National Paper Trade Association

Membership was and is confined to organizations composed of paper dealers or jobbers, and a definition of a dealer or jobber was adopted.

In the afternoon of the same day, the delegates met in conference with the manufacturers of the American Paper and Pulp Association. At the close of this meeting the following resolution was passed by the manufacturers present: "Resolved, that the manufacturers here present express their sympathy and good will towards the efforts of the National Paper Trade Association to ameliorate the abuses that have crept into their line of business, and herewith express their desire to cooperate in any way that may seem to be mutually beneficial."

At the 1904 meeting the Paper Association of Philadelphia was elected, and, in 1906, the newly organized Empire State Paper Association, covering upper New York State, was elected. The Pacific Paper Association, composed of the dealers in the Pacific Coast States,

was added to the membership roll in 1913. By 1928, when the Association celebrated its 25th anniversary, the membership consisted of fifteen local associations, the individual membership in which totaled 388. By 1947, the number of local Associations, holding membership in the National Paper Trade Association, had increased to twenty-one. This is, indeed a record of which to be extremely proud.

Salesmen's Association Of the Paper Industry

At the regular quarterly meeting of the executive committee of the American Paper and Pulp Association, July 23, 1919, a resolution was passed in favor of the formation of a salesmen's division to affiliate with the Association. Accordingly, a meeting was held in the office of the Association September 10 for the purpose of bringing together a group of salesmen representing various branches of the industry, to discuss the matter and devise plans for its immediate promotion.

It was decided that an organization of the salesmen in the paper manufacturing industry could best be effected through a unified salesmen's division of the American Paper and Pulp Association. R. S. Litchfield, manager of sales of Crocker-McElwain Company and the Chemical Paper Manufacturing Company, of Holyoke, Massachusetts, was elected temporary chairman, and authorized to appoint a committee on organization. This committee was to report and submit its plans for a permanent organization at a meeting of salesmen to be held in connection with the Fall conference of the American Paper and Pulp Association, during the week of November 10. Every salesman connected with the paper manufacturing industry in the United States was invited to attend and take part in the deliberations, assist in the organization, and become a member.

At the November 10 meeting, the formation plans were actually completed. L. B. Steward, secretary of the A.P. and P.A., who was instrumental in organizing this group, was elected president until the first annual meeting, which was held in April, 1920.

The salesmen's employment service was announced in March, 1938. In order to be of greater service to its members and to the paper industry, the Association decided to establish and operate a placement service for unemployed members seeking sales positions. A standard form of questionnaire was prepared, including standard questions, such as age, education, family, experience, etc. The list of applicants, with details regarding their qualifications, service, etc., is available to the salesmen's executives of paper mills without charge, except to cover actual expense incurred in each particular case. The Salesmen's Association is glad to hear from sales executives desiring to receive information regarding salesmen seeking positions. All requests for this service are to be addressed to the secretary-treasurer, Salesmen's Association of the Paper Industry, 122 E. 42nd Street, New York.

Purpose of the Association, as outlined in its articles, is:

(a) To bring about wider acquaintance among those engaged in the selling or promotion of sales in the paper manufacturing industry, and to promote an esprit de corps among its members.

(b) To raise the efficiency of sales methods by proper education features.

(c) To establish universally recognized standards of salesmanship.

(d) To effect and promote the development of the highest sales ethics among its members.

(e) To effect increasingly new uses and sales of paper and paper products.

(f) To do all other things that may be lawful for the advancement of the Association.

Any salesman, sales manager, or advertising manager, or other individual directly and actively employed in sales or sales promotion work by the paper manufacturing industry, is eligible to make application for membership. Committee on membership refers the application to the employing company for certification, and then acts accordingly. If a member leaves the sales department of the paper manufacturing industry, the membership becomes automatically inoperative.

The list of presidents, since its organization, includes: George K. Gibson, 1920-1921; Howard H. Reynolds, 1921-1923; Joseph L. Fearing, 1923-1925; Walter E. Perry, 1925-1927; James H. Coy, 1927-1929; Samuel C. Knode, 1929-1931; Harold R. Knott, 1931-1934; William L. Raymond, 1934-1935; Creighton W. Whiting, 1935-1936; Reginald C. Johnson, 1936-1937; Edson R. Lyman, 1937-1938; John T. Burruss, 1938-1939; Hugh N. Phillips, 1939-1940; John R. Diggs, 1940-1941; John D. Johnston, 1941-1942; Curtney H. Reeves, 1942-1943; Norman F. Beardsley, 1943-1944; Burt B. Fisher, 1944-1945; Stanley O. Styles, 1945-1946 and Forrest D. Patterson, 1946-1947.

Paper and Twine Association

During the course of a meeting and golf tournament of the Middle States Wrapping Paper Association, held at French Lick Springs, Indiana, June 25 and 26, 1935, Ray Bee, of the Southern Kraft Division of International Paper Company, suggested the formation of an organization composed of manufacturers, converters, wholesalers and others interested in the paper business, and which would meet at intervals for the purpose of creating better feeling and understanding between and among the various members of the industry, and for such other purposes as might be proper.

This suggestion was made to John L. Richey, secretary of the Middle States Wrapping Paper Association, who immediately got busy and found the suggestion was popular. At the September Fall Convention of the National Paper Trade Association, of that same year, he invited those who had attended the French Lick meeting to a luncheon in the Hotel Stevens, Chicago, at which the Paper and Twine Association was formed, with Jack Wittrock, of the Paragon Paper Company, of Cincinnati, as president, and John L. Richey as secretary.

First meeting of the organization was held at the Granville Inn, Granville, Ohio, June 23 and 24, 1936, where a golf tournament and business session was held, in connection with which Clem Boex, a Cincinnati insurance man, took the part of a Swedish paper manufacturer with 3,000 tons of kraft to offer at far below the market, which created a near riot. It was at this meeting that the idea was offered of an annual manufacturer and converter exhibit, which, later, was taken over by the National Paper Trade Association.

Annual luncheon meetings, in connection with the Fall Convention of N.P.T.A., were held thereafter, excepting during the war, as were the annual meetings and golf tournaments in June of each year. In June, 1937, a New York chapter of the Association was formed, which later pulled away from the Paper and Twine Association, and became the Paper Club of New York. The Association started the annual dinners at the Waldorf, which were taken over by the Paper Club of New York, when it was formed, and with which the Paper and Twine Association has cooperated ever since.

Jack Wittrock was succeeded in the presidency by Frank Vaughan, at that time with the Bay West Paper Company, at the annual meeting in 1938. During Mr. Vaughan's administration a great deal of work was done, in an endeavor to interest the industry in a sales training program, and in a public relations program.

Mr. Vaughan was succeeded in 1939 by Earl Beier, of Beier & Company, Chicago. Mr. Beier was succeeded by T. Floyd Smith, Jr., of the Louisville Paper Company, Louisville, Kentucky, at the annual meeting in 1940. C. V. Jewell succeeded to the presidency at the annual meeting in 1941. Mr. Jewell being succeeded in 1942 by E. J. Durkin, at that time with the Tanglefoot Company, in Grand Rapids, Michigan. Mr. Durkin served for two years, during which time, in cooperation with the United States Navy and the War Production Board, the Association put on its famous Key Kollection Kampaign throughout the United States, resulting in a large amount of so-called German silver being secured for the Navy, to be used in submarine condensers, and quite a large sum in money, resulting from the sale, was turned over to the U.S.O.

At the annual meeting in 1944, Mr. Durkin was succeeded as president by E. P. Magel, of the Crescent Paper Company, Indianapolis, who served for the succeeding two years. During this period the Association established an annual award to a student at the Institute of Paper Chemistry selected by the faculty of the Institute at Appleton, Wisconsin, the award amounting to $150. The Association also gave quite a bit of publicity to the work of the Institute of Paper Chemistry, and established an annual contribution of $1200 to the scholarship fund of that Institution. During the same period the organization cooperated with the Davidson Publishing Company, of Chicago, in putting out a sales training course for wrapping paper merchant salesmen, followed by a similar course for fine paper merchant salesmen.

During this entire period the Association continued its efforts in behalf of a public relations program, working with the American Paper and Pulp Association, the National Paper Trade Association, and the Salesmen's Assiciation of the Paper Industry.

At the 1946 annual meeting, Mr. Magel was succeeded as president by Edgar A. Hall, Jr., representing the Crossett Paper Mills, of Crossett, Arkansas. During Mr. Hall's administration, further efforts were made in behalf of a public relations program, and the interests of the sales training program, as well as the Institute of Paper Chemistry were continued. Mr. Hall, as president, also contributed a monthly president's letter, and established a standard form of public address, which might be used by members in promoting the paper industry and trade wherever the opportunity presented. During his administration a definite, planned program of public relations for paper merchants was offered, which met with wide-spread approval, but which was later dropped because it was felt that such a program belonged in the field of activity of the National Paper Trade Association.

Also, during this period, the membership having been limited to 500, the full 500 total was reached, with the fine cooperation of James E. Alcorn, of the Alling & Cory Company, in Cleveland.

Mr. Hall was succeeded as president at the June annual meeting in 1947 by James E. Alcorn, of the Alling & Cory Company, in Cleveland, at which meeting the key note for the coming year was hit in a program of endeavor to improve relations between and among manufacturers, converters and merchants.

CHAPTER XXXII

And So Three-Quarters of A Century Passed with the Paper Trade Journal

THOUGH it was the third most important industry in this country, pulp and paper manufacture had no trade publication until the appearance of the first issue of PAPER TRADE JOURNAL on May 27, 1872. The New York *Tribune* in announcing the new publication, stated "THE PAPER TRADE JOURNAL, a semi-monthly periodical, recently started in this city under the editorship of Mr. Charles F. Wingate, is one of the most elegant and attractive in appearance of all the trade papers, and we are not surprised to learn that it has been received with great favor. The paper-makers, publishers, printers, stationers, and paper-dealers, in whose interest it is conducted, form one of the most important industries in the United States. They are certainly capable of supporting a good periodical, and, in the JOURNAL, they will probably find all they require."

Howard Lockwood
Founder of the PAPER TRADE JOURNAL, *May 27, 1872.*

The office of the publication was then at 14 Park Place, New York, and Howard Lockwood was the publisher. Charles E. Wingate served as editor until July 15, 1875. The JOURNAL originally appeared as a four-page newspaper, 18¼ x 23¾ inches, seven columns to the page, and was issued on the 1st and 15th of each month. The price was ten cents per copy, or $2.50 a year. The JOURNAL filled a need, and it prospered from the start. It was encouraged by the members of the industry, both in the way of subscriptions and advertisements.

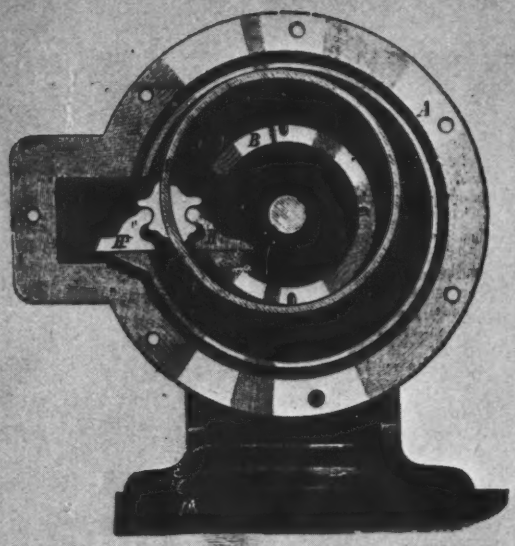
From 14 Park Place, the office was removed to 36 Beekman Street, then directly in the heart of the paper district, but the growth of the business soon caused a removal to 74 Duane Street. In 1883, larger quarters were again sought at 126-128 Duane Street, and cramped quarters necessarily led to the removal in 1895 to the corner of Bleecker Street and West Broadway. Howard Lockood died November 4, 1892, and the business was carried on by his widow, under the name of the Lockwood Publishing Company. She became president, and was later married to S. Alers-Hankey, who became treasurer of the company. Colin K. Urquhart became secretary, managing director, and editor. The paper was purchased in 1899 by Colonel C. H. Jones, who moved the business to 150 Nassau Street, and continued the business under the name of the Lockwood Trade Journal Company. In 1916, influenced again by the need for larger quarters and the strong uptown trend, which had already caused the removal of numerous important paper houses to the district around the Grand Central Terminal, the office was moved to 10 East 39th Street. In 1932, the paper was moved to its present offices, 15 West 47th Street.

Much of th news, contained in the early issues of PAPER TRADE JOURNAL, might apply to our present day. The national House of Representatives was engaged in the discussion of rates of duty on paper, books, wood, pulp, soda ash, and other raw materials and finished products. Building of new mills in Maine, Massachusetts, New York, and other centers of paper manufacturing, were announced, and there was even some construction going on in the far west. The ever-present subject of raw materials was under consideration then, as now, and the customary experiments with rice, grass, esparto, pine and other fibers were reported. Paper clothing was described as a novelty, and milk pans, cups, washbowls, and other articles of common use were being made from paper. Price of domestic rags ranged from 2⅜ to 11 cents, manila rope from 5¼ to 5½ cents, jute butts from 3¼ to 3½ cents.

The twenty-fifth anniversary number of the PAPER TRADE JOURNAL, October 19, 1897, portrayed the industry as it existed in 1872, and, in a notable selection of special articles, gave a thorough review of the growth of the industry during that quarter century. The April 13, 1922 issue of PAPER TRADE JOURNAL followed the same plan, with emphasis on the developments during the second twenty-five years of the JOURNAL's existence.

Less than a full page of the first issue of PAPER TRADE JOURNAL was devoted to advertising representing eighteen companies. Early in 1947, Advertising Age, the weekly advertising publication, published the figures on space carried by 105 industrial publications for the years 1945 and 1946. In number of pages carried PAPER TRADE JOURNAL is the 23rd paper, with a total of 2,435 pages. Compared to 1945, the JOURNAL gained the greatest number of pages, 283, with the exception of an Association publication called Chemical and Engineering News, which is the official paper of the American Chemical Society. The only publications listed, that carried more pages of space than PAPER

BAGLEY & SEWALL'S ROTARY FORCE PUMP.



Most Perfect Rotary Pump Ever Offered to the Public.

SPECIALLY ADAPTED FOR WORK IN PAPER MILLS,

And now in use in some of the largest mills in the country. These pumps are made of iron and brass, and can be used to PUMP WATER, as FIRE and FORCE PUMPS, for PUMPING SIZE, BLEACH and ALKALI LIQUORS, and for VACUUM PUMPS on SUCTION BOXES.

The following are among the leading advantages of this pump:

ITS FEW PARTS, SIMPLICITY OF CONSTRUCTION, and SMALL SPACE OCCUPIED.
ITS SMALL COST COMPARED WITH OTHER PUMPS.
THE COMPARATIVELY SMALL POWER REQUIRED (using from 30 to 75 per cent. less power than any Rotary Pump now in use).
ITS ACTION IS POSITIVE, GIVING AN EVEN AND CONTINUOUS STREAM, being perfectly balanced in the water.
ITS SELF-PACKING MATCH JOINTS, REQUIRING NO PACKING OR STUFFING BOXES.
ITS READY ACCESSIBILITY OF PARTS, without breaking joints on pipes in taking apart.
ALL PARTS ARE MADE TO AN EXACT GAUGE, corresponding parts being interchangeable.
THE SPEED CAN BE ADAPTED TO QUANTITY OF WATER DESIRED, the amount of water delivered being in proportion to speed and power applied.

These Pumps are now in use as Force and Vacuum Pumps in many of the Leading Paper Mills.

References furnished upon application.

Liberal Terms Made to First-class Parties.

Send for Price List of the

CHEAPEST PUMP IN THE MARKET.

Address **W. H. LEWIS,**
Sole Agent for Paper Mills,
NO. 74 DUANE STREET, N. Y.

PUSEY, JONES & CO.,

Wilmington, Delaware.

MANUFACTURERS OF

Fourdrinier and Cylinder MACHINES,

Washing and Beating Engines, ROTARY BOILERS, STEAM ENGINES, SHAFTING AND GEARING.

And generally all the machinery used by Paper Makers.

Boring appliances and tools of the most modern construction, large shops and skilled workmen they are prepared to execute orders with great promptness.

They especially call attention to their CHILLED CALENDER ROLLS which are ground upon their new and improved machinery, by which absolute accuracy is obtained.

Plans and specifications for paper mills furnished.

A pattern list, very valuable for mill owners, will be sent free of charge upon application.

For the character of their Chilled Iron Calenders and other paper machinery, they refer to the following among the many parties now using them.

Jessup & Moore, Philadelphia, Pa.
Martin Nixon, " "
Geo. W. Childs, " "
Mead & Nixon, Dayton, Ohio.
W. & A. Mode, Coatesville, Pa.
Beadleston, Smith & Co., Chicago, Ill.

Empire Felts.

Cylinder & Fourdrinier

WET FELTS, PRESS FELTS, and JACKETS,

Manufactured by

H. WATERBURY & CO.,
RENSSELAERVILLE,
Albany County, N. Y.

☞ In ordering Felts, give kind of Paper used and quality of paper made, and we warrant Felts that will please.

ORDERS PROMPTLY FILLED.

Our Prices are in Currency.

OHIO FELTS.

FOURDRINIER AND CYLINDER

WET FELTS,

PRESS FELTS and JACKETS,

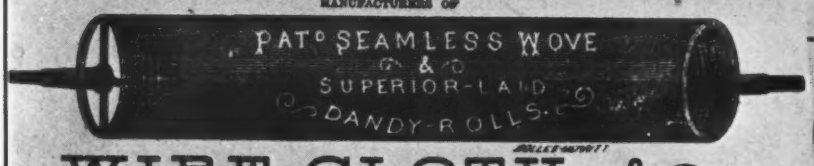
MANUFACTURED BY

Shuler & Benninghofen,

HAMILTON, OHIO.

CHENEY-BIGELOW WIRE WORKS,

MANUFACTURERS OF



WIRE CLOTH, &c.

SPRINGFIELD, MASS.

Here Are A Few PAPER TRADE JOURNAL *Advertisements of Those Then Vital Establishment Years of 1872 and 1873.*

TRADE JOURNAL, are other papers that are world famous, such as Iron Age, American Machinist, and Steel, etc. Of the three ABC papers covering the paper field, the PAPER TRADE JOURNAL carried 48.11% of all the advertising.

In 1921, PAPER TRADE JOURNAL was chosen as the official organ of the Technical Association of the Pulp and Paper Industry for the publication of its technical papers and dissemination of news about the Association.

Lockwood's Directory

Lockwood's Directory of the Paper and Allied Trades was published for the first time in August, 1873. Up to that time no mill reports had been published that were at all reliable. Even the government trade reports were not thoroughly trustworthy. Preface to the first edition reads:

"In approaching manufacturers for the necessary information to compile this Directory, the few rebuffs received will not prevent the publisher from mentioning with pleasure the general courtesy that has always been shown him by the trade in all sections of the country, and he desires to express his hearty thanks for the complete manner in which his blanks, sent to different parties, have, in the great majority of cases, been filled out. The confidence thus shown, in putting in his possession information of many important details of their business, is fully appreciated by him, and he pledges himself, as from the beginning, not to use such information, except in the general manner it now appears. . ."

The Directory was an immediate success, those wishing to do business with pulp and paper mills at once recognizing the advantages its pages offered them, and these advantages have been increasingly recognized with the passing years. The first edition of the Directory showed that, in 1872, there were in the United States 820 mills, 812 of which were operated by 765 concerns, while eight were idle. In these mills there were 299 Fourdriniers, 690 cylinder machines, and 3,269 engines, producing 317,637 tons annually, valued at $66,505,825. Value of the plants was estimated at $35,564,500. Reports showed that there were 13,427 male and 7,700 female adults and 922 children engaged in the industry. The industry was confined to New England and the Middle Atlantic States, with a few scattered among the Central States. Gradually, however, it spread to Canada and the Middle West, and, later, to the Pacific Coast and the Southern States. The 1947 edition of Lockwood's Directory shows 559 concerns operating 744 paper mills and 241 pulp mills in the United States and 90 concerns operating 97 paper mills and 120 pulp mills in Canada. There are 1,190 Fourdriniers and 630 cylinder machines in operation in the United States, Canada and Newfoundland.

Among those listed in the first edition, and still in operation, are the following: Robertson Paper Company, Montville, Connecticut. (now Robertson Paper Box Company, Inc.; Case Brothers, Inc., South Manchester, Connecticut; Rogers Paper Manufacturing Company, South Manchester, Connecticut (now Rogers Corporation); Joseph Parker & Son, Company, Westville, Connecticut (now New Haven); C. H. Dexter & Sons, Inc., Windsor Locks, Connecticut; Curtis & Brothers, Inc., Newark, Delaware (now Curtis Paper Company); Jessup & Moore Paper Company, Wilmington, Delaware (now in Providence, Maryland); L. L. Brown Paper Company, Adams, Massachusetts (formerly Greylock Paper Mills); S. D. Warren Company, Boston, Massachusetts; Tileston & Hollingsworth, Boston, Massachusetts; Hollingsworth & Vose Co., Boston, Massachusetts; Z. & W. M. Crane, Dalton, Massachusetts (now Crane & Company, Inc.); Byron Weston Company, Dalton, Massachusetts; Bird & Son, Inc., East Walpole, Massachusetts; Crocker-Burbank & Company Association, Fitchburg, Massachusetts; Crocker Manufacturing Company, Holyoke, Massachusetts; (now Crocker-McElwain Company); Fitchburg Paper Company, Fitchburg, Massachusetts; Franklin Paper Company, Holyoke, Massachusetts; Parsons Paper Company, Holyoke, Massachusetts; Valley Paper Company, Holyoke, Massachusetts; Whiting Paper Company, Holyoke, Massachusetts; C. F. Crehore & Son, Newton Lower Falls, Massachusetts; Carew Manufacturing Company, South Hadley Falls, Massachusetts; Keith Paper Company, Turners Falls, Massachusetts; Kalamazoo Paper Company, Kalamazoo, Michigan; Peninsular Paper Company, Ypsilanti, Michigan; G. A. Robertson & Co., Hinsdale, New Hampshire (now G. E. Robertson & Company); Contoocook Valley Paper Company, West Henniker, New Hampshire; W. O. Davey & Sons, Jersey City, New Jersey (now the Davey Company); Riegel Paper Corporation, Riegelsville, New Jersey (formerly John L. Riegel & Son); Phoenix Paper Company, Battenville, New York; Stevens & Thompson, North Hoosic, New York (now in Greenwich, New York); Knowlton Brothers, Inc., Watertown, New York; Taggart Brothers' Company, Watertown, New York (now Taggart Corporation); West Virginia Pulp & Paper Company, New York, New York; Mead Corporation, Chillicothe, Ohio; Thomas Phillips Company, Akron, Ohio; Beckett Paper Company, Hamilton, Ohio; Miamisburg Paper Company (originally Miami Valley Paper Company) Miamisburg, Ohio; D. M. Bare Paper Company, Roaring Springs, Pennsylvania; P. H. Glatfelter Company, Spring Grove, Pennsylvania; Shyrock Brothers, Downingtown, Pennsylvania; Beloit Boxboard Company, Beloit, Wisconsin; Kimberly-Clark Company, Neenah, Wisconsin; and Nekoosa-Edwards Paper Company, Inc., Nekoosa, Wisconsin.

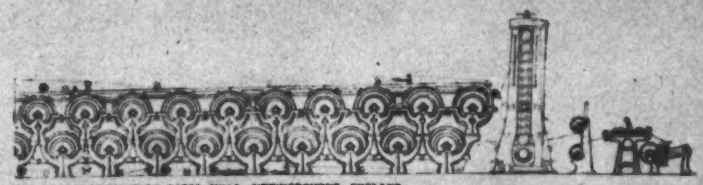
This book has grown in size from 212 pages in 1873 to well over 1300 pages in 1947.

Howard Lockwood

Howard Lockwood, the founder of the PAPER TRADE JOURNAL, was born at at White Plains, New York.

PAPER-MAKING MACHINERY.

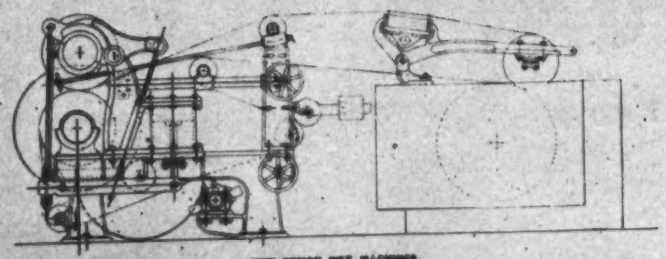
SIDE ELEVATION OF 127-INCH FAST-RUNNING FOURDRINIER FOR



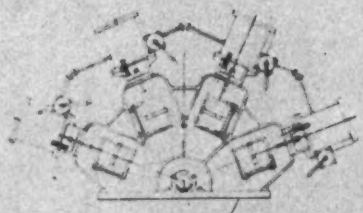
THE "EARLY GIBSONIAN" PAPER MILLS, SITTINGBOURNE, ENGLAND.

THE BAGLEY & SEWALL CO.,

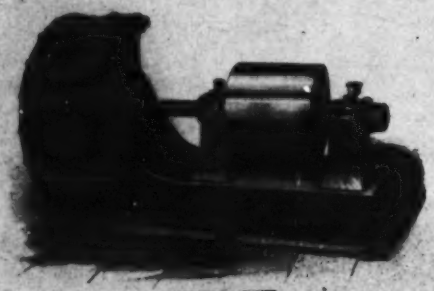
Watertown, N.Y., U.S.A.



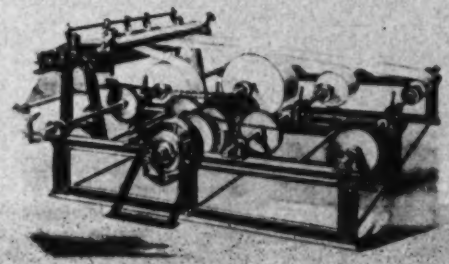
NEW DESIGN WET MACHINES.



NEW DESIGN PULP GRINDER.



CENTRIFUGAL PUMPS.



COMPENSATING WINDERS FOR ANY DESIRED NUMBER OF SHAFTS.

REWIND WINDERS, REELS AND SLITTING MACHINES.

March 9, 1846. He was the son of General Munson I. Lockwood, and was a lineal descendant of Robert Lockwood, first of the name in the United States, who was an emigrant from England in 1630, and who settled at Watertown, Massachusetts. Descendants of Robert Lockwood took an active part in the Colonial and Revolutionary wars, twenty-three of them having participated in the former conflicts, and nearly 200 of them in the latter. On his mother's side Mr. Lockwood was descended from Nicholas Delaplaine, a distinguished Huguenot, who came to America and settled on Manhattan Island, where he died in 1790.

In 1865, Mr. Lockwood came to New York, and secured employment in a Duane Street paper house. He applied himself to his new duties with industry and intelligence and soon acquired a very thorough knowledge of the business, together with an understanding of the scope, extent and processes of paper manufacture. In the Spring of 1872, believing that there existed the necessity for a representative paper in the paper field, he established the PAPER TRADE JOURNAL. There was a great deal of opposition to the proposition to establish such a paper, many of those engaged in the making and selling of paper expressing the belief that there would be entirely too much news furnished to people, and that readers fould come into the possession of information which, in those days of comparatively slow communication, was held by only the few. These reasons, presented to him in forcible shape, did not deter Mr. Lockwood in the slightest. On the contrary, they emphasized the necessity for such a paper.

He began the publication in a modest way, bringing it out, at first, as a semi-monthly of four pages. It was very evident, from the start, that he intended to print all the news which he could obtain, and to print it in a dignified, forceful style, which would commend his undertaking to every serious, sensible man whose commendation was worth having. That his judgment was well founded, and that he was right and his critics wrong as to the matter, has been settled emphatically by the position which PAPER TRADE JOURNAL has always occupied as the leader since its first issue.

Mr. Lockwood had, of course, a very wide acquaintance in the trade, and his opinions, which were well matured before they were expressed, were respected even by those who disagreed with him. In the conduct of the JOURNAL he was eminently fair, and in considering the line of policy to be pursued as to any given matter, he held firmly and tenaciously to his original determination to print a paper which should contain, not only all the news, but which should be a reflection of the progress of the entire trade in all its departments, from week to week.

Mr. Lockwood believed that the editorial and news end of the paper should be conducted entirely uninfluenced by the business office. Not only was that his belief, but it was his practice. If the true story of an event of sufficient trade interest to warrant publication was presented to him, he always and invariably insisted that it be printed for the benefit of the entire trade, without any regard to whether those whom it affected were or were not represented in the advertising columns of the JOURNAL.

He founded the JOURNAL as an independent trade paper, and he never deviated a straw from that line of policy. He was not trained in the newspaper business, but he possessed that tact and judgment which led him in the right direction, and which made of his work the success that it was.

He had an abhorrence of shams, particularly of those in the trade, and he neglected no opportunity to expose them.

Mr. Lockwood took a deep interest in everything which was connected with the paper and allied trades, and always, both by word and act, aided every movement which had for its object the benefitting of those engaged in these lines. He was an ardent advocate for the forming of a national association, and, after the establishment of the American Paper Manufacturers' Association (now the American Paper and Pulp Association) he gave assistance to that work whenever and wherever he could, and was influential in bringing about many adjustments and reforms within the Association. For years he presented a statistical report at the annual meetings of the Association.

Following Mr. Lockwood's death November 4, 1892, the business was continued by the Howard Lockwood Publishing Company, of which his widow was president.

Colonel Charles H. Jones

The business was sold in 1899 to Colonel Charles H. Jones, who continued the business under the name of the Lockwood Trade Journal Company. Colonel Jones was prominent in national politics, and was one of the best-known newspaper men in the country. He had for some time been associated with Joseph Pulitzer, in the publication of the New York World, of which he was managing editor. He was induced by Mr. Pulitzer to leave that position and go to St. Louis to take charge of the St. Louis Post -Dispatch, as editor and general manager, which position he held until 1896, when he retired from daily journalism because of ill-health.

When he bought the Lockwood publications in the Spring of 1899, he made his brother, the late George W. Jones, manager, although he gave them much personal attention and continued as careful a supervision as his health would permit until his death in 1913. On the acquisition of the property his exceptional genius as a publisher became immediately manifest in many improvements, among them the change to the present form of the PAPER TRADE JOURNAL.

Leslie R. Palmer

After Colonel Jones' death the controlling stock in the Lockwood Trade Journal Company was acquired by Leslie R. Palmer. The other part was retained by the

STEAM PRESSURES

exceeding one hundred pounds are common in these days, and every engineer understands their advantages for large plants. He also understands that the high pressure and intense heat accompanying it try every gasket most severely — so severely that ordinary packing will not answer. To stand the pressure the material must possess great strength, and to stand the heat must be composed of ingredients which do not char or burn out. These points **RUBY PACKING** possesses in the highest degree. Carried in thicknesses from $\frac{1}{32}$ to $\frac{1}{4}$ inch. Send for samples.

Belting
Rolls
Packing
Gaskets
Water Hose
Steam Hose
Fire Hose
Dechel Straps
Specialties

Chicago.....143-145 Lake St.
St. Louis.....310 North 12th St.
Indianapolis.....70 S. Illinois St.
Philadelphia.....308 Chestnut St.
Boston.....24 Summer St.
San Francisco.....509-511 Market St.

NEW YORK BELTING & PACKING CO. LTD

PIONEERS AND LEADERS, 25 PARK PLACE.

NATRONA POROUS ALUM

FOR PAPER MAKERS' USE.

The Strongest and Purest Alum made and the only Alum made from Kryolith Alumina.

PENNSYLVANIA SALT MFG. CO.,

W. M. ELLICOTT & SONS, Baltimore, Md.,
MOREY & CO., Boston, Mass.,
GEO. H. EMBREE, New York,
} Agents.

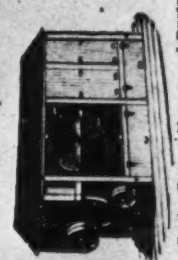
115 CHESTNUT STREET
PHILADELPHIA, PA.

TAYLOR, STILES & CO.,

RIEGELSVILLE, WARREN CO., N. J.,

Manufacturers of **THEIR IMPROVED GIANT RAG CUTTERS.**

Fly Bars, Bed Plates, Rag Cutter, Barker and Chipper Knives; also Paper Trimming Knives.



The Taylor Patent Cleaner and Duster.

Old Advertisers, Old Type, Cuts, and Old Machines.

"EXCELSIOR" FELTS.

PIECE FELTING AND JACKETING.

FOR ECONOMY, DURABILITY AND GOOD RESULTS THEY ARE UNEQUALED. LONG ESTABLISHED AND WELL KNOWN. A TRIAL IS SOLICITED FROM MANUFACTURERS NOT ALREADY USING THEM.

Satisfaction guaranteed. *EXTRA HEAVY CANVAS DRYERS.*

Send for Price-List.

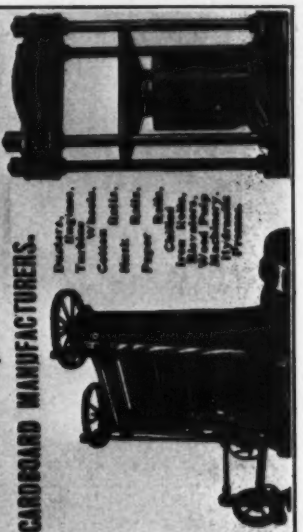
BULKLEY, DUNTON & CO.,

74 John Street, NEW YORK.

HOLYOKE MACHINE CO.,

HOLYOKE, MASS.

All Kinds of CALENDERS for PAPER MILLS, GLAZED PAPER and CARDBOARD MANUFACTURERS.



COMBINED CONDENSER AND SOLDERED.

Jones estate. Mr. Palmer was a member of the Palmer family, which came to this country from England in 1620, settling in Connecticut, though Mr. Palmer was born at Thompson Ridge, Orange County, New York. He was a graduate of Ithaca High School, and entered Cornell University on a scholarship. He received the degree of Ph.B. and LL. B. from this institution in 1897. He was admitted to the bar the same year, and practiced law in New York City, specializing in corporation and real estate law, until 1912.

During this period he also became interested in banking. He became president of the First National Bank of Croton-on-Hudson, New York, in 1908, and, in 1913, he became president of the Commonwealth Security and Mortgage Company. Mr. Palmer was one of the original directors of the Federal Reserve Bank of New York. He was also president of the First National Bank of Yonkers and of the First National Bank of Hastings, New York. The paper prospered under his management. It was during his regime that it became the official organ of the Technical Association of the Pulp & Paper Industry. Palmer, however, preferred to confine himself more completely to banking and real estate, and this influenced him in 1923 to dispose of his interest in the business to George S. Macdonald, who became vice president and treasurer.

George S. Macdonald
Late Publisher of Lockwood Publications

George S. Macdonald

Mr. Macdonald, a widely experienced publisher, took a deep interest in the publication, and which soon manifested itself in many improvements, although he assiduously avoided making any revolutionary changes that would radically alter the character of the paper.

In February, 1925, the technical publication called *Paper* was acquired and consolidated with the PAPER TRADE JOURNAL. In July, 1928, Mr. Macdonald acquired by purchase the interest in the property held by the Jones estate, and became president of the Lockwood Trade Journal Company. Mr. Macdonald was a vital personality. This fact was constantly demonstrated throughout his life. It was first importantly manifested when his education was discontinued early in life, against the wishes of his father, who greatly desired him to enter the medical profession. He had no patience, however, with the idea of spending long years of comparative inactivity in preparing himself for a professional life. He personally preferred a business career for which he felt himself temperamentally and otherwise better fitted. This estimate of himself proved correct, for he soon showed decided business ability, and made successes of various ventures where others had failed, or had met with only indifferent success.

Mr. Macdonald was progressive in his ideas. He did not hesitate to make any changes in his publications that would make them more interesting or more helpful to the industry. He did not undertake changes of any character, however, until he was absolutely convinced that they were worthwhile, and that they would be likely to meet with the approval of the great majority of the subscribers to the publications. He hated waste, not only because he was of a thrifty disposition, but because he disliked to see the fruits of labor indifferently treated or carelessly destroyed without doing good.

Mr. Macdonald passed March 18, 1945, and his grandson, George E. Lockwood, became president of Lockwood Trade Journal Co.

George E. Lockwood

George E. Lockwood, like Howard Lockwood, is also a descendant of Robert Lockwood, but is of distant relationship to the founder of PAPER TRADE JOURNAL.

After graduation from Cornell University in 1935, Mr. Lockwood joined the staff of PAPER TRADE JOURNAL. His first job was to sell advertising in New England, which he continued to do until the end of 1945. In 1939, he added the coverage of the New York State and Pittsburgh territories to his outside duties in the paper industry.

As time went on, various corporate duties were given and to Mr. Lockwood. In 1939 he was elected a director and treasurer of the corporation, and, in 1944, vice

Established 1862 Incorporated 1867

CHENEY BIGELOW WIRE WORKS

SPRINGFIELD, MASS.

FOURDRINIER WIRES
DANDY ROLLS
CYLINDER MOLDS

CYLINDER COVERING
A SPECIALTY

LARGE WIRE SIGNS FOR MILL ROOFS

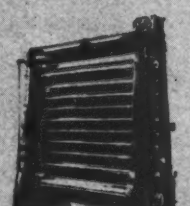
BRASS, COPPER AND IRON WIRE CLOTH

OFFICE RAILINGS AND GRILL WORK

THE formation of our partnership in 1858—sixty-four years ago—insures us a position in the 50th anniversary number of the Paper Trade Journal. From time to time in the past our mill has been extended as the demand for "Hamilton" felts continued to grow. At present we have under construction an addition to our manufacturing plant, 88 ft. x 292 ft. in size and 3 stories in height, which will be equipped with modern woolen machinery for making felts for the widest paper machines. This proposed increase in capacity is intended to enable us to fill orders with promptness when the paper business again assumes normal conditions.

Shuler and Benninghofen,
Miami Woolen Mills,
Hamilton, O.

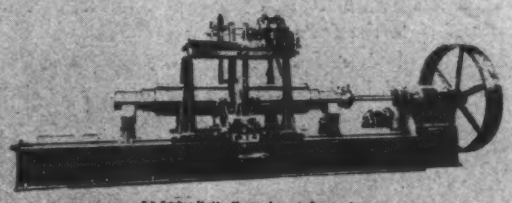
LOBDELL QUALITY-PRODUCTS



Machine Calenders
with
Chilled Iron Rolls
equipped with
Patented Electric Motor Lift
Hydraulic Lift or Ratchet Lift
All operated from floor

Micrometer Calipers
Handy and Accurate

Roll Grinding Machines
provided with
Patented Automatic Crown Device
Suitable for grinding rolls of any material and all sizes



LOBDELL CAR WHEEL CO.
WILMINGTON, DELAWARE

1858 ESTABLISHED SMITH, WINCHESTER & CO. 94 YEARS 94 CONTINUOUS SERVICE 1952

BUILDERS OF THE
FIRST FOURDRINIER MACHINE
BUILT IN THE UNITED STATES

PAPER MILL MACHINERY

1858 ESTABLISHED PAPER MACHINERY MAKING LEADERS 1952

FIFTY YEARS AGO

Completed for Smith Paper Co. LEE, MASS.

November 26, 1901 Our Jordan & Sawtelle Patent Rubbing Engine Price $00.00

Completed for Thomas Phillips Co. AKRON, OHIO

April 6, 1901 One 42" Cylinder Machine Price $000.00

THE SMITH & WINCHESTER MFG. CO.
SOUTH WINDHAM, CONN.
1905—INCORPORATED—1905

In April, 1901, We Purchased the Business of THE FRANK A. JONES CO.—Their Complete Line of Paper Bag Machinery—The Cranston & Jones UNDERCUT CUTTERS

In April, 1900—We purchased of THE NATIONAL MFG. CO. Their Complete Line of "NATIONAL BAG MAKING MACHINERY"

TODAY

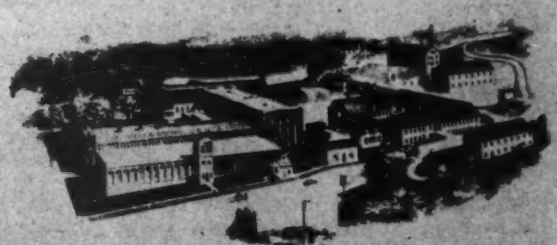
We Solicit Your Inquiries

On OUR RECORD OF SERVICE TO THE PAPER MAKING INDUSTRY

BUILDERS AND BUILDERS OF MACHINERY

SUCCESSFUL IN OPERATION

INTEREST IN PRODUCTION



Replica View of Our Works First Which Included in Buildings of THE ORIGINAL OFFICE AND SHOP The Present Office Building Was Completed Fifty Years Ago

president and treasurer, and, finally, on the death of Mr. Macdonald in March, 1945, he was elected chairman of the board, president and treasurer.

The tremendous strides made by the paper industry over the past 75 years have been equalled and aided by PAPER TRADE JOURNAL. Its voice was the first and strongest in advocating a national association and, later, in the establishment of schools of papermaking.

GEORGE E. LOCKWOOD
Publisher of the PAPER TRADE JOURNAL, LOCKWOOD'S DIRECTORY, *and* PAPER MERCHANDISING

In addition to its large circulation in the United States, the foreign circulation of PAPER TRADE JOURNAL has grown until it now covers practically every known country on the face of the globe, including Burma, Ceylon, Iraq, Java, Lebanon, Palestine, Siam, Tasmania, and Ruckheim, in addition to the more widely known countries of the five continents. The manner in which PAPER TRADE JOURNAL has become an internationally read publication was particularly emphasized during the recent World War. Many European subscribers sent in checks to pay for their subscriptions, several years in advance, with the request that the copies be stored for them until the cessation of hostilities, when they could be shipped to them in bulk. Requests are still coming in from all corners of the world for copies as far back as 1940.

Unfortunately, because our supply of paper during the war years was limited, the run on PAPER TRADE JOURNAL was restricted, and we were unable to comply with many of these requests. One of our subscribers in Buenos Aires has his copies forwarded to him weekly by air mail. Correspondence is arriving regularly from manufacturers of paper in Japan, telling of their progress in reestablishing their mills, requesting we hold copies until it is possible for them to import such publications again, and asking us for the titles of any additions to our list of literature for the industry. Early in August a German subscriber placed close to $200 on deposit with us to be consumed in sending him copies of the various publications published by Lockwood in the interests of the paper trade.

Much of the correspondence received by us during the war years contained more than an element of romance. At the height of the seige of Leningrad, we received a request from the Russian Purchasing Commission for books which had been advertised in PAPER TRADE JOURNAL to be shipped to the besieged city. September 26, 1941, the official organ of the Swedish Paper Mills Association, "Svensk Paperstidning." sent us their check for a year's subscription to PAPER TRADE JOURNAL with the comment, "Should the situation become such that you consider mailing inadvisable, we would greatly appreciate it if you would reserve and store copies for us for delivery when times have again

PERKINS & GOODWIN,

COMMISSION

Paper Warehouse,

IMPORTERS AND DEALERS IN

PAPER MAKER'S SUPPLIES OF ALL KINDS,

SPECIALTIES IN PAPER,

Book & Straw Print,

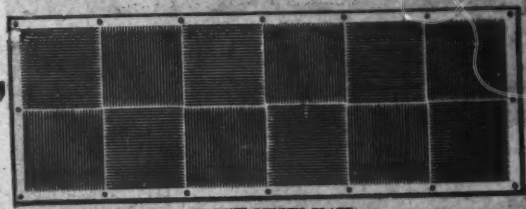
84 Duane Street,

Three doors east of Broadway,

NEW YORK.

UNION MACHINE COMPANY

Works, 44 & 46 Water Street, FITCHBURG, Mass.



PATENT SCREEN PLATE.

SCREEN PLATES

A SPECIALTY

Fourdrinier and Cylinder Pap[er] Machines, Rag Engines and Cutter[s], Dusters, Cylinder Washers, Pulp Strainer Tubes, Press Rolls, Coat[ing] Rolls, Chilled Calenders, Brass Rolls, Tube Rolls, Suction Boxes, Suction Plates, Pumps, Screw Plates, Shafting, Gearing, etc.

BULKLEY, DUNTON & CO.,

NOS. 75 AND 77 DUANE STREET, NEW YORK,

"EXCELSIOR" FELTS

PIECE FELTING and JACKETING

For Economy, Durability and Good Results they are Unequaled. Long Established and Well Known. A Trial is Solicited from Manufacturers not already Using them.

EXTRA HEAVY CANVAS DRYERS

SATISFACTION GUARANTEED. SEND FOR PRICE LIST.

NEW YORK Belting & Packing COMPANY,

The oldest and largest manufacturers in the United States of

Vulcanized Rubber Fabrics

ADAPTED TO

Mechanical Purposes,

invite the attention of all who are interested in the sale or use of such articles to the high standard quality and low prices of their various manufactures, comprising

Machine Belting,
Steam Packing,
Leading Hose,
Suction Hose,
Car Springs,
Wagon Springs,
Billiard Cushions,
Grain Drill Tubes,
&c. &c. &c.

"TEST" HOSE

made expressly for the use of Steam Fire Engines, and will stand a pressure of 400 pounds per square inch. Officers of Fire Departments, requiring New Hose, will find this much superior in strength and quality to any other.

Patent Solid Emery Vulcanite Wheels

a composition of rubber and emery, making a very hard uniform substance of the nature of stone throughout. These wheels, for grinding and polishing metals, "gumming" saws, etc., are the most economical and effective tools that can be used.

WAREHOUSE,

37 & 38 Park Row, New York.

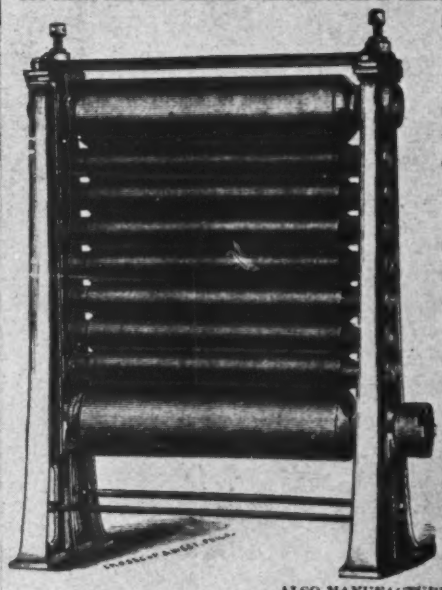
JOHN H. CREEVER, Treasurer.

Price-lists and further information may be obtained by mail or otherwise on application.

LOBDELL CAR WHEEL COMPANY,

WILMINGTON, DEL.

The Oldest and Most Extensive Manufacturers of Chilled Car Wheels in this or any other Country.



EXTRACT OF AWARD ON CHILLED ROLLS.

The undersigned having examined the product herein described respectfully recommends the same to the United States Centennial Commission for award, for the following reasons, viz.:

This exhibit contains a stack of calendering rolls intended to be part of a complete paper machine. These rolls are of cast-iron, chilled at the surface in casting, and thereby made hard, like tempered steel. They are separately ground according to a highly improved plan, and are so true that, when placed together, they bear upon each other throughout their entire length. This exhibit has the exceptional merit that the rolls are not only GROUND true but CAST by the exhibitor.

(Signed) JAMES M. WILCOX,
Signature of the Judge.

ALSO MANUFACTURERS OF

CHILLED ROLLS

For Paper Machines, Rubber, Brass, Copper, Rolling Mills, &c.

The vast quantity of iron used daily in the business of this establishment permits the very best selection for the composition of CHILLED ROLLS. The long experience of Mr. Geo. G. Lobdell in making chilled castings, and who personally directs the selection, enables them to make

CHILLED ROLLS UNEQUALED IN QUALITY AND GROUND AS PERFECTLY AS ANY OTHERS.

GEO. G. LOBDELL, Pres. W. W. LOBDELL, Sec. P. N. BRENNAN, Treas.

Names of Old Firms, Old Equipment, Old Methods—Down Through the Years They Have Stood the Test of Time, Developing Advanced Ways of Performing New Industrial Tasks for This Huge Paper Industry.

become normal." In June, 1942, they sent us a check for $130.80, covering shipping costs by air for PAPER TRADE JOURNAL from November 20, 1941, to June 30, 1942. We endeavored to comply with their request, but the limitation on air mail to Sweden was two ounces. The Swedish Government Cargo Clearance informed us that the only possibility of getting the copies of the JOURNAL through was to have "Svensk Paperstidning" apply to the Trade Commission for permission to have these copies sent by steamer. This necessitated securing an export license in the United States by the Swedish Government Cargo Clearance. When notified of the situation, we received the following radiogram November 19, 1942—"Letter October 7th Much Appreciated Please Arrange Shipping Immediately Copies Accumulated November 20th, 1941 Boat Leaving End of This Month Transport License Nr G6353 Received Cargo Clearance Instructed Telegraphically." These copies were finally shipped, but the copies for 1943 and 1944 were stored by us until the cessation of hostilities, when they were forwarded in one lot through the American Express Company.

Not only do our friends from abroad show their interest in PAPER TRADE JOURNAL by subscribing to it, but the JOURNAL is repeatedly quoted by publications printed in other countries. In England, "The World's Paper Trade Review," which is seven years younger than PAPER TRADE JOURNAL, and the "Paper-Making and British Paper Trade Journal," which has just issued its 103rd volume, credit PAPER TRADE JOURNAL with news items and technical articles in practically every issue. The Swedish "Timber and Wood Pulp Journal" also frequently quotes from PAPER TRADE JOURNAL.

CHAS. H. JONES

MRS. C. ALLERS-HANKEY

LESLIE R. PALMER

Practically every University in this country subscribes for PAPER TRADE JOURNAL. Recently, we received a request from the University of California for all issues of the JOURNAL from 1872 until the present time. All public libraries and many private ones are also among our subscribers.

Circulation of PAPER TRADE JOURNAL has always been available for verification by anyone interested. Immediately after the establishment of the Audit Bureau of Circulations, PAPER TRADE JOURNAL became one of its members. During the years it has been a member its circulation has increased steadily, until, at the present time, its circulation and distribution is just about double what it was at the time of its original audit.

It is not through accident that PAPER TRADE JOURNAL is, and always has been, the leader in its field. New developments, in any part of the industry, have always been reported promptly in PAPER TRADE JOURNAL. During the early stages of the development in the south, PAPER TRADE JOURNAL devoted several issues to these projects, giving a complete story of each of the mills involved. These mill stories were written by the companies especially for PAPER TRADE JOURNAL. The mill numbers of PAPER TRADE JOURNAL, which are issued during November of each year, contain complete reports of the new developments in the industry. These stories are, for the most part, written by the mills or their engineers.

In line with PAPER TRADE JOURNAL's policy of reporting promptly conditions in the trade in all parts of the world, a series of articles, describing conditions in Germany, was started with the July 17, 1947, issue, especially written for PAPER TRADE JOURNAL by the former technical editor of an outstanding German weekly serving the paper trade.

In the 75 years of its existence, in spite of varying conditions, PAPER TRADE JOURNAL has never missed an issue.

A complete file of every copy of PAPER TRADE JOURNAL, for the past 75 years, is available to those interested who visit our offices in New York.

In addition to the information published in each issue of PAPER TRADE JOURNAL, and the other Lockwood publications, Lockwood Trade Journal Company also operates a readers' service bureau, through which information pertaining to the industry is disseminated.

In May, 1947, in the year of the seventy-fifth anniversary of PAPER TRADE JOURNAL, Mr. Lockwood introduced a new publication, PAPER MERCHANDISING, which, it is hoped, will enjoy at least seventy-five years of service to its field.

Smith Winchester & Co.,

South Windham, Conn.,

MANUFACTURERS OF

PAPER MACHINERY

CONSISTING OF

FOURDRINIER AND CYLINDER MACHINES,

Washing and Beating Engines.

AIR-DRYING MACHINERY

FOR DRYING SIZED PAPERS.

Sole Manufacturers of the

JORDAN PATENT BEATING ENGINE,

Which has no rival for clearing the stock for fine papers.

CHILLED IRON & PAPER ROLL

SUPER CALENDERS.

Also,

Chilled Stack Calenders, Rag Cutters, Hand Pow
Cutting Presses, Stop Cutters.

THE HATCH PATENT

Stop Cutter,

*The only Cutter that can be regulated to cut between wat
marks of writing papers.*

SCREENS,

BRASS AND NICKEL PLATED.

The latter warranted to wear twice as long as bra

BED PLATES, ROLL BARS,

FAN AND PLUNGER PUMPS.

TAYLOR, STILES & CO.,

Musconetcong P. O., Warren Co., N. J., Manufacturers of

PAPER MILL ENGINE FLY BARS

AND BED PLATES,

RAG CUTTER KNIVES, TRIMMING KNIVES FOR

SHERIDAN'S, SANBORN'S, RIEHL'S AND OTHER TRIMMING PRESSES,

STRAW CUTTER KNIVES FOR PAPER MILLS,

AND PATTERN KNIVES GENERALLY.

Our Improved Combination BED PLATE has superior advantages over all others. It is SELF-SHARPENING, being made of BEST QUALITY Sheet Steel of any desired thickness. It BEATS FAST, makes GOOD STUFF, and requires less care on part of engineer than any other plate, and if not found satisfactory after a trial of sixty days, IT CAN BE RETURNED, and the MONEY WILL BE REFUNDED.

R. R. AND TELEGRAPH STATION, RIEGELSVILLE, N. J.

Holyoke Machine Co.,

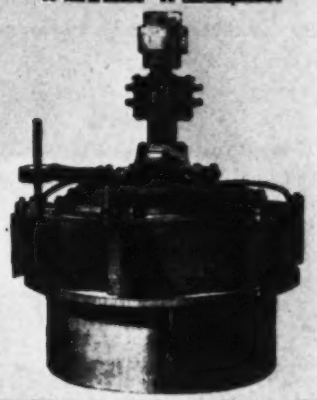
MANUFACTURERS OF THE

BOYDEN TURBINE,

AND THE

DAYTON AMERICAN TURBINE

WATER WHEELS.



NATRONA

POROUS

ALUM,

FOR

PAPER MAKERS' USE.

FREE FROM IRON AND FROM EXCESS OF ACID.

Two pounds of it will size as much paper as three pounds of Potash or Ammonia Alum.

Pennsylvania Salt Mfg. Co.

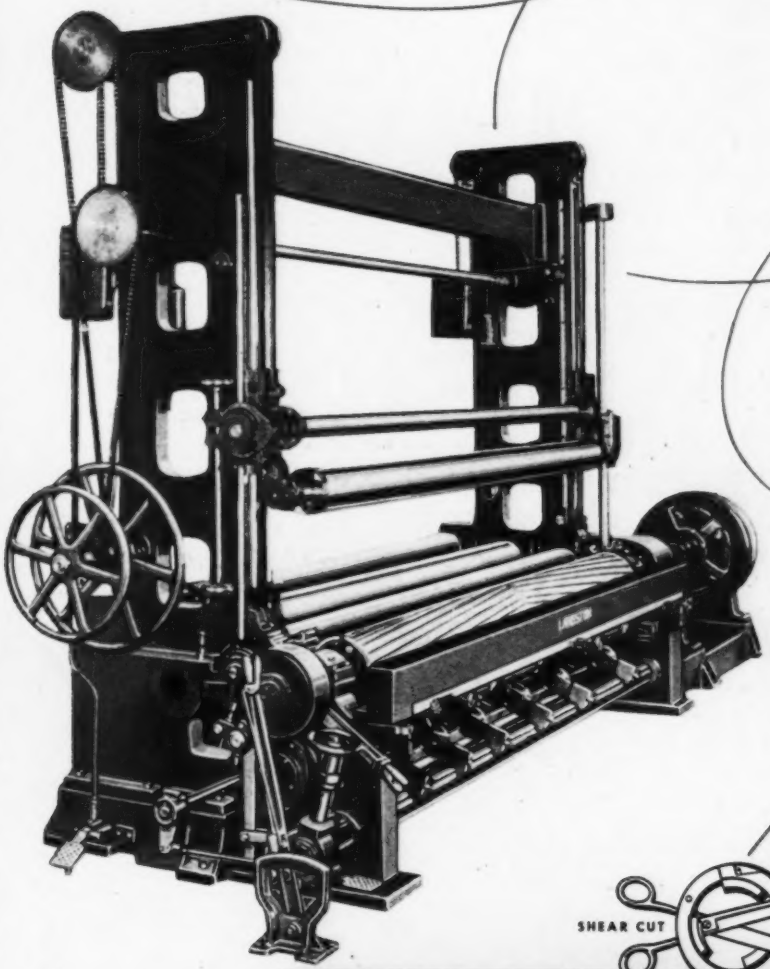
No. 122 WALNUT ST.,

PHILADELPHIA.

Still Most Powerful Factors in This Industry After 70 Years of Service to the Paper Trade All Over the Productive World

One of the first Langston Slitters & Roll Winders

BUILT IN THE EARLY 1900's



One of the latest.

This 113" Type "CA" is one of five sizes and types of modern, high-speed Slitters and Roll Winders built by Langston. You can select just the right machine for every job in Mill, Finishing Room or Converting Plant. All Langston Slitters and Roll Winders are noted for exceptional performance with low maintenance costs.

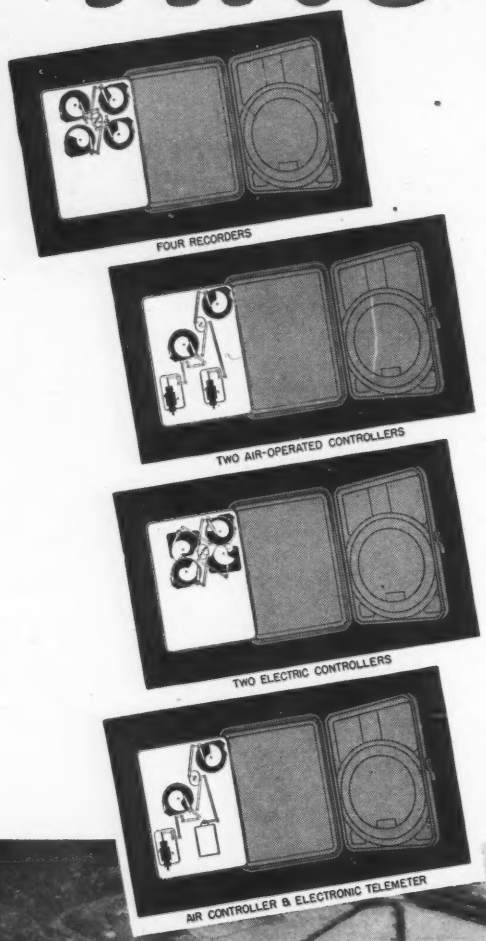
SAMUEL M. LANGSTON COMPANY

CAMDEN, N. J.

CORRUGATING EQUIPMENT • PRINTER-SLOTTERS

SPIRAL PAPER TUBE AND CAN EQUIPMENT

these and 100,000 more



FROM 4 CIRCUITS AND 8 BASIC PARTS

What's your control problem? Flow—temperature—level? Are you using solids—liquids—gases?

No matter what you process, four basic circuits and eight basic component parts will give you more than 100,000 different electronic measuring and controlling combinations. That's how Bailey has simplified controls for processing industries.

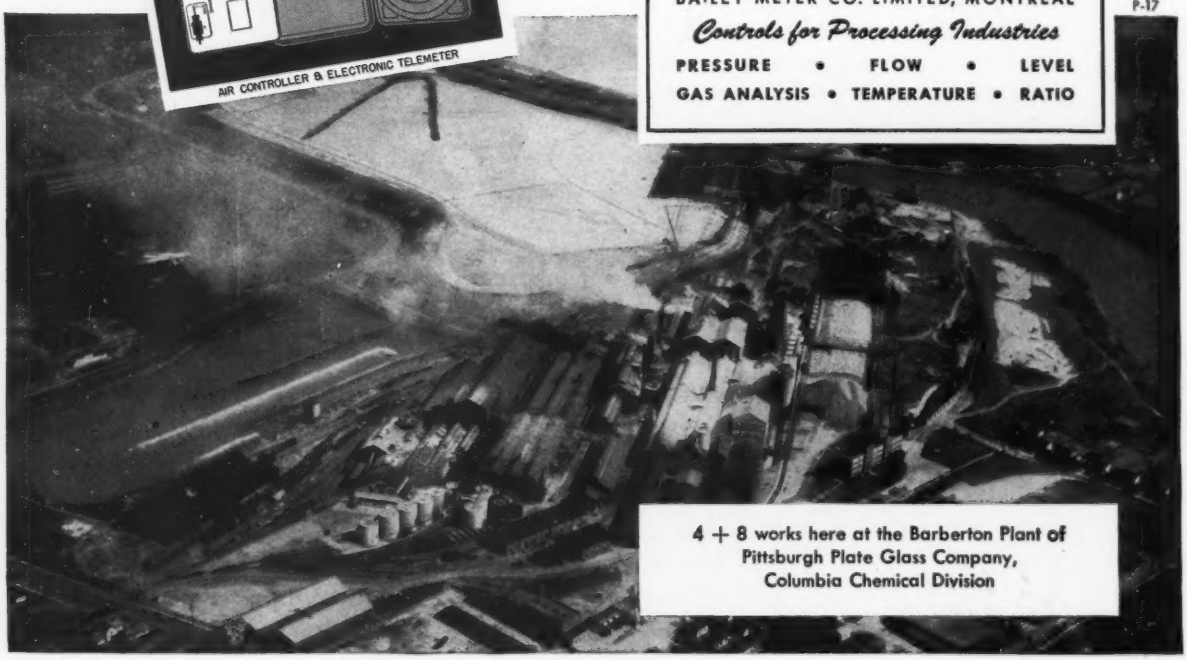
The four arrangements illustrated show how easily Bailey interchangeable parts can be used. It's no longer necessary to carry a huge stock of replacement parts for emergency control installations. When you standardize on Bailey controls you are always ready to meet changing conditions within your plant.

And with Bailey simplified controls, your maintenance costs will be less. Maintenance men quickly become familiar with Bailey controls and spend less time on maintenance and installation.

To see for yourself how you can profit with Bailey controls, write for a copy of our bulletin No. 17.

BAILEY METER CO.
1056 Ivanhoe Road • Cleveland, Ohio
BAILEY METER CO. LIMITED, MONTREAL
Controls for Processing Industries
PRESSURE • FLOW • LEVEL
GAS ANALYSIS • TEMPERATURE • RATIO

P-17



4 + 8 works here at the Barberton Plant of Pittsburgh Plate Glass Company, Columbia Chemical Division

A LINE OF MACHINES YOU CAN DEPEND ON—

ROTARY FOLDERS

Paper Towel [1]	Facial Tissue	Wax Paper
Toilet Tissue [2]	Paper Napkin [3]	Paper Table Cover

WINDERS

Paper Towel	Drum Winders	Jumbo Roll
Toilet Tissue	Crepe Paper	Friction Winders

PRINTING PRESSES

Multi-Color Rotary Web	Oil Ink	Arc Type
Multi-Color Rotary Sheet	Aniline Ink	In Series Type

WEB EMBOSSERS

Glassine	Tissue	Name
Board	Napkin	Book and Writing
Towel	Wrapping	Special Purpose

BUNDLING PRESSES

Adjustable Tissue Napkin Multi-Wall Bag

CREPE MACHINES

Tissue Waterproof Kraft

MISCELLANEOUS

Toilet Roll Wrappers	Vacuum Pumps
Seat Cover Machines	Web Die Inkers
Spiral Core Machines	Spiral Core Recutters
Collapsible Reels	Cellulose Laminating Machines

1—All various types of folds. 2—All various folds. 3—A wide variety of folds.

We build considerable special machinery to do specific work to meet a customer's particular requirements.

Write for complete details on any machine in which you may be interested.

SIMPLICITY THE KEYNOTE OF OUR MACHINE DESIGN

PAPER CONVERTING MACHINE CO., GREEN BAY, WISCONSIN

and for 45 years of the 75...

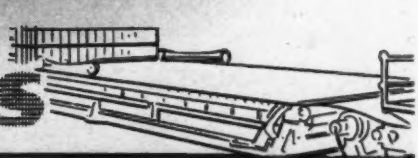
LINDSAY FOURDRINIER AND CYLINDER WIRES FOR PAPER MAKING

THE LINDSAY WIRE WEAVING COMPANY

Serving the Paper Industry Since 1903

14001-14299 ASPINWALL AVENUE • CLEVELAND 10, OHIO

Lindsay **WIRES**



FOR PAPER MILLS

It runs in the family . . .

Ever since the days of ancient Egypt, paper making has been largely a family art, passed along from fathers to sons, from generation to generation. Even today in many of America's most important paper and board mills the top executives are men of advanced age, who learned their trade from their fathers and who now take pride in the fact that their sons will succeed them.

Not a few of those "old-timers" found Hamilton Felts on the machines at which they began their careers. Those felts had been made by the grandfathers of the skilled craftsmen who are now "key men" in the Hamilton organization. Their sons are in line for their places. **The knowledge, experience** and skill of generations are your assurance that there will always be a Hamilton Felt that will do your work better, faster and at lower cost.

« « » »

SHULER & BENNINGHOFEN, HAMILTON, OHIO

Miami Woolen Mills

Hamilton Felts

Established 1858

STICKLE

EQUIPMENT HAS INCREASED PAPER MAKING CAPACITY & REDUCED STEAM COSTS

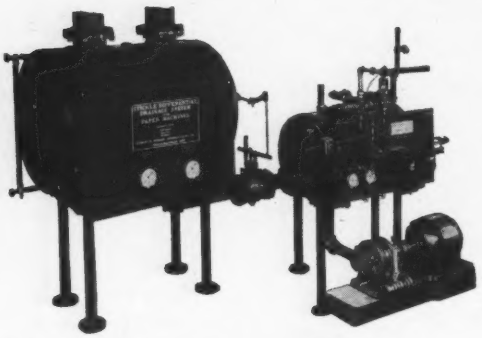
MODERN paper making advanced into an era of production efficiency and exact regulation of quality with introduction and development of Stickle Drainage and Control Equipment. Without the use of delicate or involved mechanism, Stickle Equipment provides for uninterrupted production at maximum machine speed.

Stickle Automatic Control admits steam as required by the dryers and maintains production at a predetermined moisture content within a variation of one-half of one per cent. Drying is uniform. Cockling, curling, and shrinking are reduced. Dryer snap-offs are practically eliminated. Steam consumption is reduced as much as 20 percent. Machine capacity is increased up to 30 per cent.

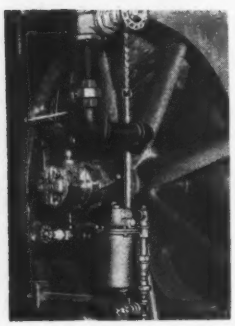
Stickle Differential Drainage—available for machines operating at high or low pressures, or on vacuum—keeps dryers free of condensate. Positive circulation of steam is maintained. Differential for proper drainage is held regardless of pressure or demands on dryers. Actual operating condition of each dryer is visible.

All these advantages also are available with Stickle Individual Trap Drainage when conditions of operation indicate its choice.

Stickle Differential Boiler Return System permits condensate to be pumped, under pressure, to boilers at the temperature it leaves dryers, without addition of live steam, greatly reducing makeup water requirement and saving fuel.



Flash Tank and Pumping Unit of Stickle Differential Drainage and Boiler Return System, available for machines operating at low pressures to several inches of vacuum as well as those operated at high pressures.



Stickle Differential Valve automatically maintains required differential between two sections for circulation and drainage, regardless of pressure or demand on dryers.

Stickle Individual Trap Drainage for machines operating at low pressures or on vacuum.

Stickle Visible Micro Adjustable Orifice assures accurate, modulated temperature for dryers, instant visible check on operation, and eliminates excessive blowing through.

Stickle Tension and Thermal Control automatically smooths out variables, holds moisture constant, and reduces non-productive time.

Interesting and Helpful Information

The elements which may be combined into a complete Stickle Drainage and Control System to meet specific conditions of operation—including Stickle Vacuum Blast Coil Heaters, Stickle Heat Reclaimers, and Stickle Open Coil Feed Water Heaters and Purifiers—are described in Bulletin No. 160. Ask for a copy. No obligation.

STICKLE
STEAM SPECIALTIES COMPANY

2215 VALLEY AVENUE, INDIANAPOLIS 18, INDIANA

For 45 Years Reducing the Cost of Steam for Paper Making

Modern, Integrated Facilities

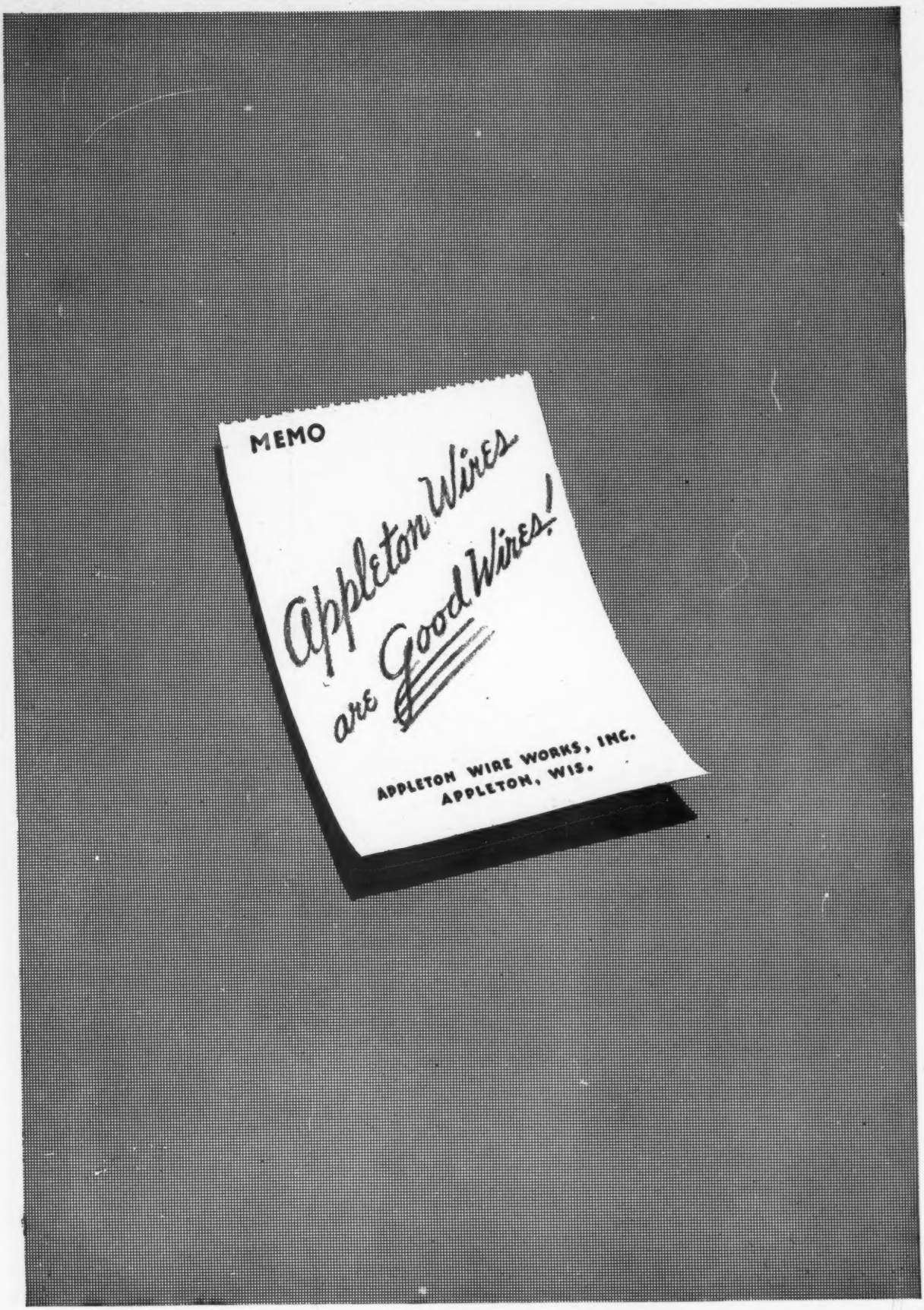
Engineering • • • Patterns • • • Castings • • • Machining • • • Assembly • • • Testing

Downingtown Mfg. Co., Downingtown, Pa.

DOWNINGTOWN

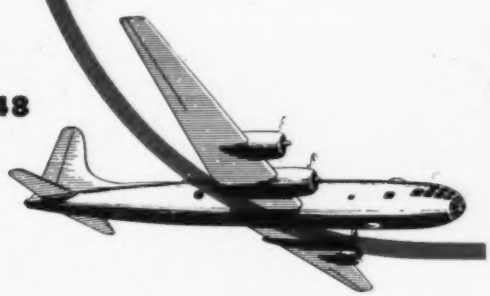
Designers & Builders

Paper Making Machinery


MEMO
Appleton Wires are Good Wires!
APPLETON WIRE WORKS, INC.
APPLETON, WIS.

1833

1900



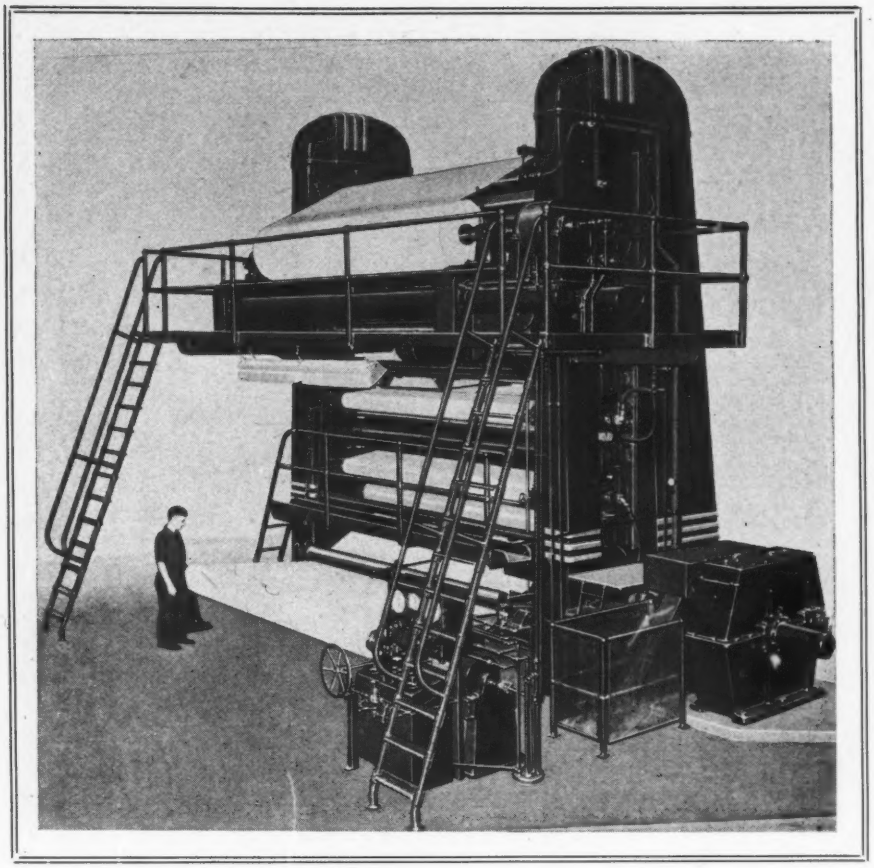
1948

THREE GENERATIONS...

From the small paper business in downtown New York established in 1833, three generations of Bulkleys have built a unique organization whose activities now reach into practically all branches of the industry in every part of the world where pulp and paper are produced, converted and consumed. This continuous development through more than a century could not have occurred without foresight, imagination and progressive thinking on the part of those who have guided the fate of Bulkley, Dunton. The basic principle laid down by Edwin Bulkley, the founder, has remained unchanged. In simple language this principle is: to build friendly and mutually beneficial relationships between producer, converter and consumer. Bulkley, Dunton believes that by building and maintaining such relationships here and abroad it has not only achieved leadership in its own field, but has also contributed to the growth and progress of the entire pulp and paper industry.

BULKLEY-DUNTON
ORGANIZATION
295 MADISON AVENUE, NEW YORK 17, N. Y.

BULKLEY, DUNTON & CO., INC. • BULKLEY, DUNTON PULP CO., INC. • BULKLEY, DUNTON PAPER CO., S.A.
BULKLEY, DUNTON CELLULOSE EXPORTS, INC. • BULKLEY, DUNTON PAPER (FAR EAST) CO., INC.
Offices and representatives in 59 cities in the United States, Latin America, Europe and the Far East

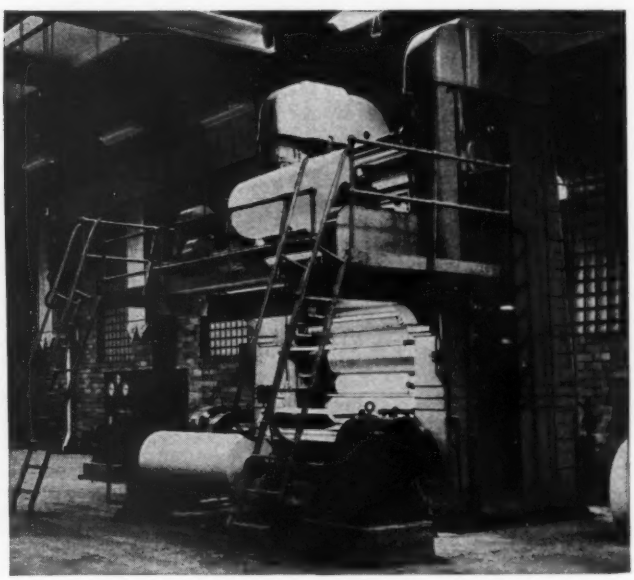


COMPLETE SUPERING EQUIPMENT FOR THE PAPER INDUSTRY

APPLETON

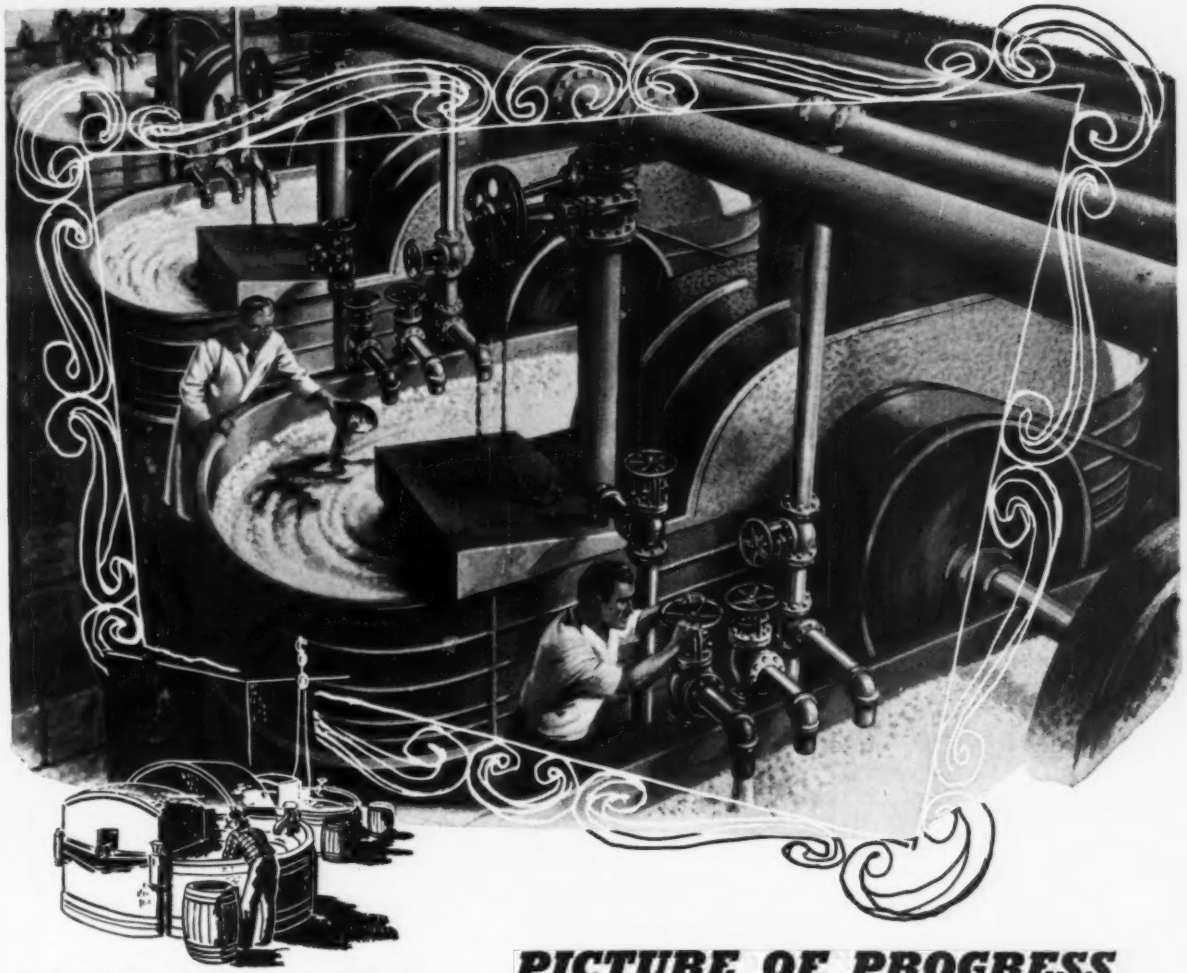
Superfinishing Equipment

The new supercalender room at the Blandin Paper Company, Grand Rapids, Minnesota, is a good example of the trend to greater efficiency and high-speed finishing in the modern paper mill. The illustration shows a recently installed 76 inch, 10 roll Appleton Super-stack operating at a speed of 1800 feet a minute. It is equipped with the Appleton Hydraulic Pressure System, Appleton Enclosed Oil Feed System, Appleton Operating Control Panel, Appleton New Process Filled Rolls, Appleton Unwind Reel, Appleton Windup Reel with Electric Tension, Appleton Friction Brakes and Torrington Anti-friction Bearings.



THE APPLETON MACHINE COMPANY • Appleton, Wisconsin

San Francisco • Portland • PACIFIC COAST SUPPLY CO. • CASTLE & OVERTON, Inc. • 630 Fifth Avenue • New York

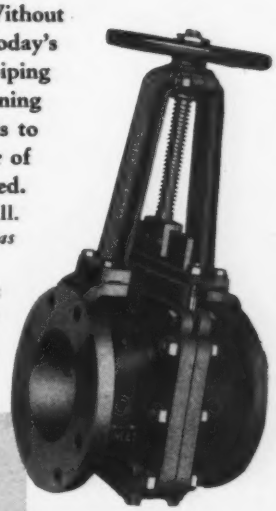


IN 1855 the beater and washer operation in a rag mill looked like this. IN TODAY'S beater room, piping takes over the work of handling power and process fluids—and most likely, it's Crane piping equipment.

PICTURE OF PROGRESS IN PAPER MAKING!

. . . Modern chemistry . . . machinery . . . piping systems! Without them, paper might still be a luxury item. For example, can you imagine today's continuous processing techniques and mass production of paper without the aid of piping equipment? Crane Co. is proud to have served the paper industry from the beginning of its great forward strides. And to share in developing better piping materials to help make better paper. Crane takes such jobs in stride as the world's leading supplier of piping materials—brass, iron, steel, and alloy—for every pulp and paper mill need.

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas



PROGRESS IN VALVE DESIGN is typified by this Crane patented pulp stock valve that eliminates the cause of clogging in pulp transfer lines. Has shearing-action disc; always seats tightly. Self-cleaning; easy to operate; non-restricting to flow. Outside screw and quick-opening types in sizes up to 24-in. See your Crane Catalog, p. 375.

EVERYTHING FROM . . .

VALVES • FITTINGS
PIPE • PLUMBING
AND HEATING

CRANE

FOR EVERY PIPING SYSTEM

Through the years...

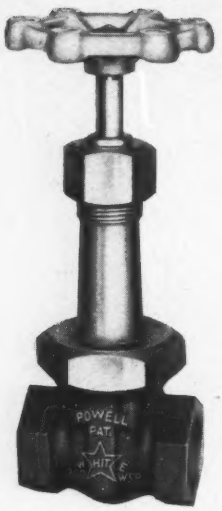


Fig. 375— 200-pound Bronze Gate Valve with screwed ends, inside screw rising stem, union bonnet and renewable, wear-resisting "Powellium" nickel bronze disc.

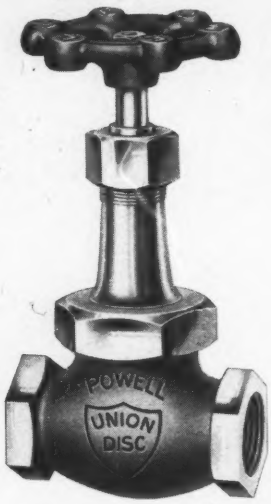


Fig. 150—150-pound Bronze Globe Valve with screwed ends, union bonnet and renewable composition disc.

Fig. 1893—125-pound flanged end Gate Valve designed especially for Paper Mill Service. Body, bonnet and yoke are cast of 3% Nickel Iron; stem and screwed-in seat rings are of 18-8S Mo.; solid wedges are made of Ni-resist.

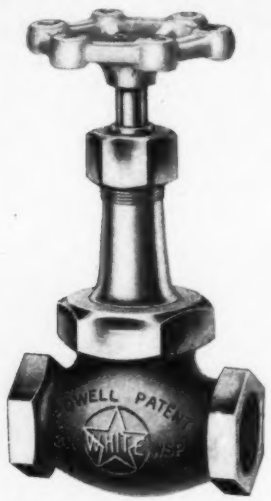


Fig. 1708—200-pound Bronze Globe Valve with screwed ends, union bonnet, renewable, specially heat treated stainless steel seat and regrindable, renewable, wear-resisting "Powellium" nickel-bronze disc.

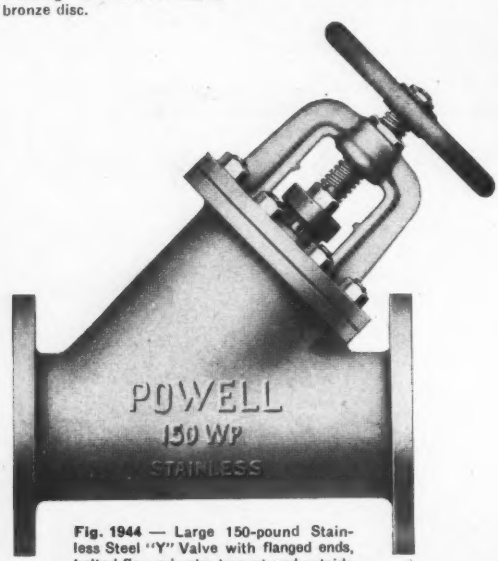


Fig. 1944 — Large 150-pound Stainless Steel "Y" Valve with flanged ends, bolted flanged yoke-bonnet and outside screw rising stem.

Fig. 559—125-pound Iron Body Bronze Mounted Swing Check Valve. Flanged ends, bolted flanged cap and regrindable, renewable bronze seat and disc. Disc, when wide open, permits full unobstructed flow through valve body

POWELL

POWELL has kept pace with the *Paper Industry*

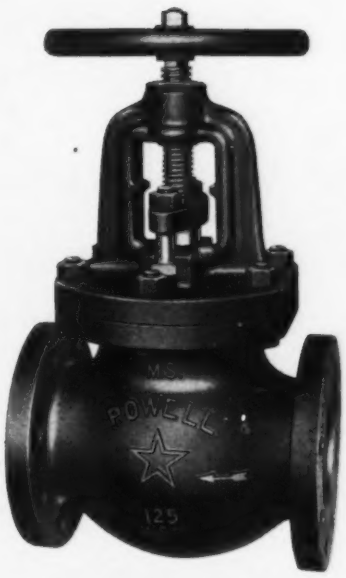


Fig. 241—Large 125-pound Iron Body Bronze Mounted Globe Valve. Made in sizes 2" to 16", inclusive. Has outside screw rising stem, bolted flanged yoke and regrindable, renewable bronze seat and disc. Also available in All Iron.

As amazing as the changes in methods of transportation have been since 1846, the progress of industry has been well nigh incredible.

And through more than a century of keeping pace with every new industrial development, Powell has been meeting and often anticipating each new requirement of the Paper Industry.

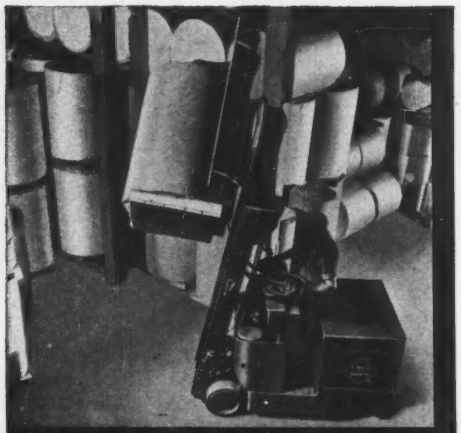
Today the Powell Line of Valves for the Paper Industry includes Bronze Valves of every required type, Cast Steel Valves in pressure classes from 150 to 2500 pounds, and all types of Iron Body Bronze Mounted Valves for low pressure steam and water lines.

For the corrosive services such as handling the black, white, or green liquors, Powell Valves are made in All Iron, Iron Body with Bronze Trim, and Iron Body with Special Alloy Trim. For handling cooking liquors, Powell Stainless Steel Valves are available.

The Wm. Powell Company, Cincinnati 22, Ohio

DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

VALVES



ROLLS can be picked up from either position; transported; rotated 90°; and high tiered.

Benefit by

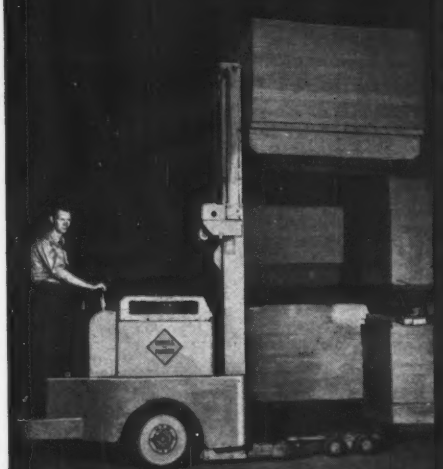
ELWELL-PARKER'S

Unequalled Experience in Paper Handling

PULP—By carrying palletized loads of laps on E-P trucks, accidents are avoided—time, man power and space are saved.

CARLOADING is often done in an hour by this E-P truck with rotating apron that picks up, transports, and tiers.

BALES of flax straw for paper specialties are high piled on skids into master loads, then carried to the bleacher.



FLAT STOCK in skid loads is high tiered in mill warehouse to use all space profitably.

From the wealth of its 42-year experience, Elwell-Parker has originated many unique truck and crane attachments for the Paper Industry *exclusively*—and also has devised operating practices to insure greatest returns from their use . . . In transporting *every* type of paper load, through Mill, Plant and Warehouse, Ellwell-Parker's *longer* experience can help you speed production without interrupting present operations. This automatically increases safety. NEW profits follow.

For quick action call in your man.

The Elwell-Parker Electric Company, 4500 St. Clair Ave., Cleveland 14, Ohio.

SCIENTIFIC PAPER HANDLING is explained in this free booklet. 44 pages; 125 photos. Ask for "Industrial Logistics in Paper".

ELWELL-PARKER

POWER INDUSTRIAL TRUCKS

Established 1893

What Nalco
SLIME CONTROL SERVICE
can do in your mill!

Right — A section of the recently enlarged Nalco Microbiological Laboratories — where your slime control problems get the expert attention that leads to permanently satisfactory results.

Below — Simple Nalco report forms help to insure accurate routine control and analyses of day-to-day water and treatment conditions in your mill.

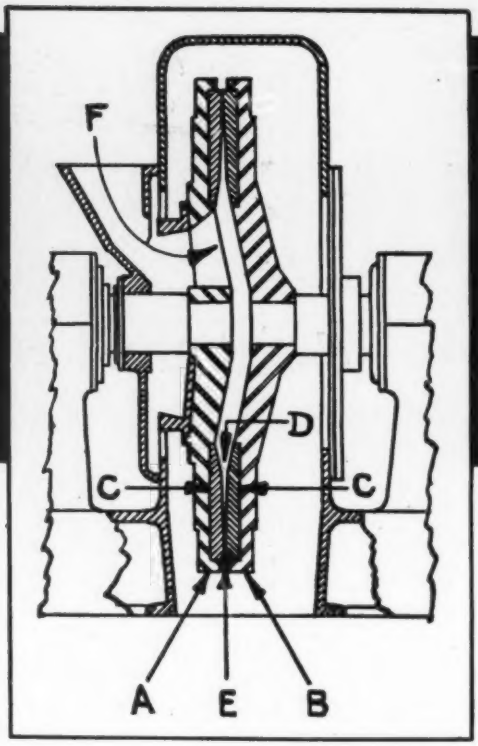
FIRST and foremost, **the Nalco Slime Control System can relieve you of the time, worry and effort involved in keeping slime conditions under control in your mill.** Nalco engineering and microbiological surveys establish the treatments needed for most economical control of your particular mill conditions. Simple control procedures are set up to provide accurate dosages for the numbers and types of slime-producing micro-organisms present. Provisions are made to vary treatment with changing day-to-day conditions. Nalco Field Service Engineers make regular calls to see that the Nalco System is operating at top efficiency. And the Nalco Laboratories keep an expert analytical eye on your entire treatment through detailed routine checks of samples from various sections of the mill.

Call your Nalco Representative for further details on Nalco . . . the *sure* way to permanently successful results.

NATIONAL ALUMINATE CORPORATION
6221 W. 66th Place, Chicago 38, Illinois
Canadian inquiries should be addressed to Aluminate Chemicals, Ltd.
555 Eastern Avenue, Toronto 8, Ontario

The Scientific System of Water Treatment for Pulp and Paper Mills

Nalco



Chips enter at "F", pass at "D" between the renewable fiberizing plates. "C", attached to the oppositely rotating discs "A" and "B" and pulp is discharged at "E".

BAUER PULPER INSTALLATIONS

Produce Long, Pliable, Free Fiber. From Many Different Raw Material Sources for Almost Every Grade of Finished Output.

The tabulation of actual mill applications below illustrates the range of work obtainable with Bauer equipment.

Raw Chips from Logs or Wood Waste, Slabs, Edgings, Tree Tops, Veneer Waste.	● For use in all types of Insulating Board and Wallboard and Hardboard Production and for Plastics of Various Grades.
Steamed Chips. Semi-Chemically Cooked Chips.	● For use in all types of Insulating Board, Wallboard and Hardboard and for Plastics of Various Grades.
Extracted Chestnut Chips. Extracted Pine Stump Chips.	● Semi-Chemically Cooked for Manufacture of .009 for Corrugating and for Wallboard.
Groundwood Bull Screen Rejects. Groundwood Knotter Screen Rejects. Groundwood Fine Screen Rejects.	● For manufacture of Newsprint, special Wrapper Stock and Board.
Hardwood Sulphite. Bleached and Unbleached Sulphite. Soda Pulp.	● Reduction of shive count and pitch spots, improved formation of tissue, book and other grades of paper.
Kraft Knotter Rejects. Kraft Screen Rejects.	● For inclusion in various grades of Kraft Board and Kraft Bag Papers.
Sulphite Screen Rejects.	● For use in Newsprint, also in Board and Specialties.
Waste Printed Papers, Waste Ledgers. Waste Wet Strength Papers. Waste Corrugated Papers. Waste Paper in General.	● For use in Paper Board as Filler and Liner; for Auto Panel Board; for Wallboard Filler; in preparation for De-inking Processes; wherever freeness, freedom from cutting, uniformity, and complete defibering is required.
Bagasse Fiber. Licorice Root Fiber. Bamboo Fiber.	● For use in Insulating and Building Board. For use in Special Board Output. For special Paper and Board grades.

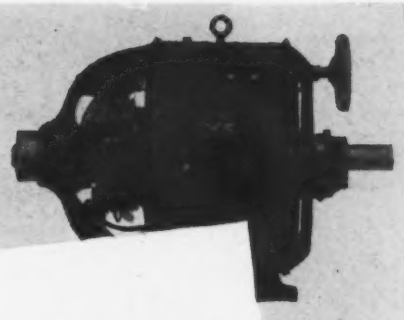
Bauer Pulpers are in service in: The United States, Canada, Mexico, Hawaii, New Zealand, Australia, India, Sweden, Russia

THE BAUER BROS. CO.

SPRINGFIELD, OHIO

40 YEARS AGO

RELIANCE GAVE INDUSTRY THE FIRST
WIDE-RANGE ADJUSTABLE-SPEED MOTOR



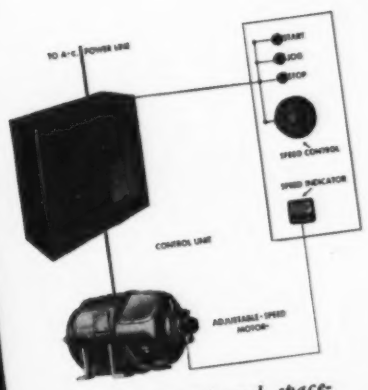
Today.. RELIANCE V★S DRIVE offers

WIDER SPEED RANGES FROM A-c. CIRCUITS

. . . plus synchronized multi-motored operation, controlled acceleration and deceleration . . . greater flexibility

RELIANCE V★S DRIVE

The All-Electric Adjustable-Speed Drive for A-c. Circuits



Conveniently-packaged, space-saving V★S Drives are available from 1 to 200 hp. Two or more Motors may be operated simultaneously from a single Control Unit.

In a great variety of applications throughout the paper industry, Reliance V★S Drives have so stepped up production and trimmed costs they have paid for themselves many times over. Mills everywhere now vote V★S the simplest, most effective and most economical means ever developed for providing adjustable speeds from A-c. circuits. That's why it will pay you to investigate the possibilities of V★S in your mill by writing today for Bulletin 311.

RELIANCE ELECTRIC & ENGINEERING CO.
1099 Ivanhoe Road • Cleveland 10, Ohio

Appleton, Wis. • Birmingham • Boston • Buffalo • Chicago • Cincinnati • Dallas
Denver • Detroit • Gary • Grand Rapids • Greenville, S. C. • Houston • Kansas City
Knoxville • Little Rock • Los Angeles • Milwaukee • Minneapolis • New Orleans
New York • Philadelphia • Pittsburgh • Portland, Ore. • Roanoke, Va. • Rockford
St. Louis • San Francisco • Seattle • Syracuse • Tampa • Tulsa • Washington, D. C.
Mexico City, Mexico • Montreal, Canada • Sao Paulo, Brazil

RELIANCE A-C D-C MOTORS

"Motor-Drive is More Than Power"

"Commerce"

BASIC MINERAL WAXES, LAMINANTS, PETROLATUMS AND PARAFFIN WAXES

THE BEST WAXES
FOR HEAT SEALING, COATING, LAMINATING AND IMPREGNATING
MADE BETTER

"Commerce" waxes are manufactured from selected crude petroleum. Through close process control they are uniform in production and guaranteed to have less than usual tolerances allowed in most manufacturing procedure.

"Commerce" MICRIS — Basic unadulterated micro-crystalline waxes with exceptional film strength and flexibility. MICRIS mineral waxes are tasteless, odorless and non-toxic.

"Commerce" SERSEAL — Pure hydrocarbon compounds, composed of high grade micro-crystalline waxes, resin and high molecular weight —high viscosity polymers. Designed for best performance in coating or laminating processes.

"Commerce" PETROLATUMS — USP and industrial grades for use as impregnants as well as for pharmaceutical purposes.

"Commerce" PARAFFINS — Crystalline paraffine waxes are available in slack, crude scale, semi-refined and fully refined grades. These waxes are supplied at all melting points.

CONSULT OUR LABORATORY ON ANY PROBLEM OF PAPER TREATMENT

Samples furnished upon request.

COMMERCE OIL CORPORATION
WARREN, PENNSYLVANIA

"Commerce"
Formerly HARRY R. LEWIS COMPANY

Water and White Water Treating Equipment by HARDINGE

For the past forty-two years Hardinge engineers have been acquiring the "know-how" to manufacture and install process equipment for the paper-making and allied industries.

Today, thousands of Hardinge installations in United States, Canada, and South America—many of them engineered early in the century—provide ample evidence of the efficiency, low maintenance requirements, and long life of Hardinge products.

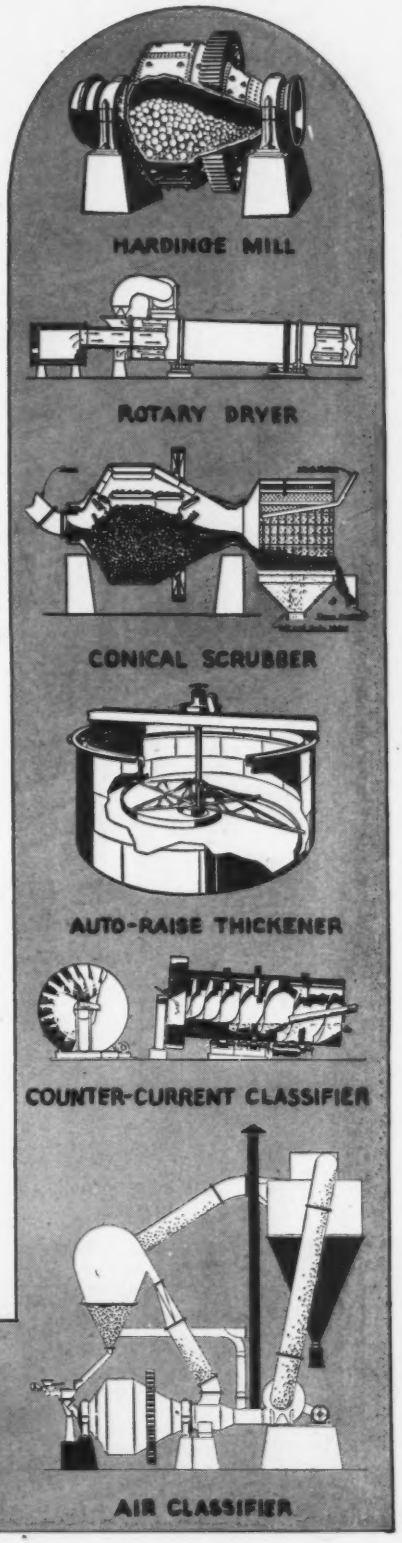
★ **AUTOMATIC BACKWASH SAND FILTER**—An entirely new type of sand filter with a traveling backwash mechanism which cleans the filter bed, automatically, without shut-down or change-over. Highly efficient in extracting fine suspended matter from paper mill water supply. Ideal for reclaiming solids from "white water", leaving the filtered water sufficiently clean for reuse on showers. Bulletin 46.

★ **CLARIFIERS—CIRCULAR OR RECTANGULAR**—In the circular model, double-spiral or cut-flight scrapers remove settled solids quickly at the tank center. The rectangular model is designed for limited spaces or where sludge delivery is desired at one end of the tank. For removal of settleable solids from waste water and mill water supply. Bulletin 35-B.

★ **"AUTO-RAISE" THICKENER**—As its name implies, the "Auto-Raise" driving mechanism lifts the entire scraping assembly upward when an overload occurs in the tank bottom, thus avoiding scraper breakage when used for heavy sludges. Bulletin 31-D.

★ **FLOCCULATING EQUIPMENT**—Slowly rotating paddles hold solids in suspension—create optimum flocculating conditions. Usually followed by a clarifier in raw water treatment. Bulletin 46.

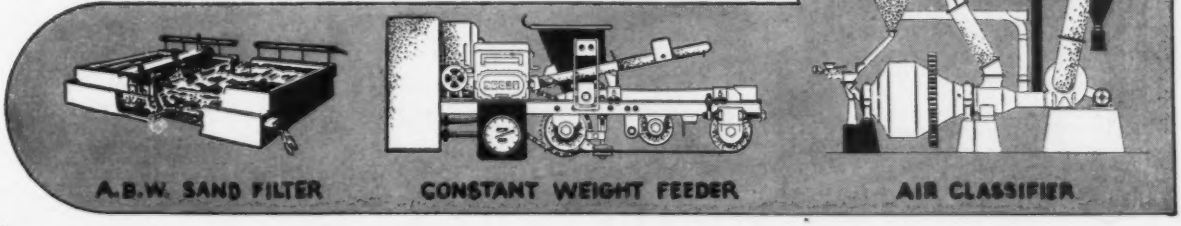
★ **OTHER HARDINGE PRODUCTS**—Hydro Classifiers, Counter-Current Classifiers, Agitators, Standard Sand Filters, Slurry Mixers, Diaphragm Pumps, Reversed-Current Air Classifiers, Grinding Mills of all types, Conical Scrubbers, Rotary Dryers-Kilns-Coolers, Rotary Tubular Conveyors, Automatic Centrifugal Clutches, Constant-Weight Feeders, Disc Feeders, Drum Feeders.



HARDINGE

COMPANY INCORPORATED

YORK, PENNSYLVANIA — 240 Arch St. • Main Office and Works
NEW YORK 17—122 E. 42nd St. • 205 W. Wacker Drive—CHICAGO 6
SAN FRANCISCO 11—24 California St. • 200 Bay St.—TORONTO 1



Appleton FELTS

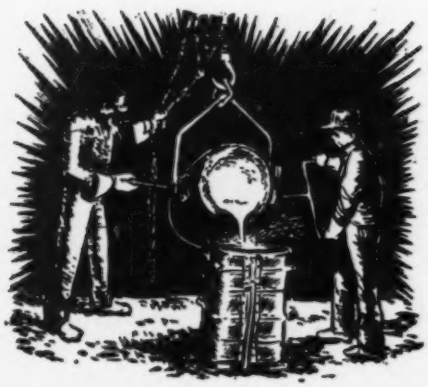
MAKE GOOD PAPER ~~

TRADE MARK
REG. U. S.
PAT. OFF.

APPLETON WOOLEN MILLS

APPLETON · WISCONSIN

RESEARCH - DESIGN - FOUNDRY *- MILLING - SHIPPING*



One important process in the production of Bagley and Sewall Paper Mill Machinery is the pouring of castings in the large modern foundry at our plant in Watertown. Here each casting . . . large or small . . . is made with the utmost precision. Every operation is checked and double checked.

These precision methods make it possible for Bagley and Sewall to produce the finest paper mill machinery to meet your individual needs. Ask to see our sales engineers. They are prepared to solve your production problems.

BAGLEY & SEWALL

DESIGNERS AND BUILDERS OF PAPER MAKING MACHINERY

WATERTOWN, NEW YORK

Bleach Liquor Prepared in 30 Minutes...

Preparing bleach liquor by introducing chlorine into excess milk of lime and waiting for it to settle is a time consuming process. In addition, it entails an expensive outlay for settling tanks and large storage facilities, the inconvenience of waiting and of sludge washing to say nothing of high labor costs. Nor can clear bleach liquor be used to buffer the bleaching operating beyond the solubility of lime.

These weaknesses in the preparation of bleach liquor were of concern to Hooker Technicians who realized that economies in pulp and paper production help Hooker as well as the industry. After a thorough investigation, Hooker Technicians, working with the pulp and paper industry, showed how a bleach liquor could be prepared so as to be used without settling and with resulting economies in equipment, labor and time. The key to this process is a low cost but efficient screen for the removal of all but the finest of the insoluble particles of lime before chlorination. Also important to the process is the agitation of the lime during chlorination and storage.

Coincidentally with the development of this process and its equipment, Hooker Technicians suggested the use of this same type of screen for introducing clean lime for "liming" in the chlorination stage.

- Hooker Bulletins 201 and 242 are devoted to a discussion of the production and use of unsettled bleach liquor and the equipment for this process. They are available when requested on your company letterhead.

HOOKER CHEMICALS

HOOKER ELECTROCHEMICAL COMPANY
6 UNION STREET • NIAGARA FALLS, N. Y.
New York, N. Y. • Wilmington, Calif. • Tacoma, Wash.

7-377 **Caustic Soda Muriatic Acid Sodium Sulfide Paradichlorbenzene Chlorine Sodium Sulfhydrate**

Sutherland FIRST

About twelve years ago, the "then" astounding news leaked out that kraft paper was being made from stock prepared alone by Sutherland Continuous Beaters and Refiners. It had never been done before; some people didn't believe it, but it's been true ever since.

The original 14 Sutherlands in this mill are still in use, one more having been recently added. This mill produces well over 500 tons daily, their output ranging from 30 to 70 lb. bag, through 25 to 80 lb. wrapping, to 42 to 105 lb. liner board, and other specialty grades.

This is only one of many "Sutherland Firsts," and it produced a power saving of approximately 50% which, over a period of twelve years, has brought them a "substantial" return on their original investment, plus other advantages.

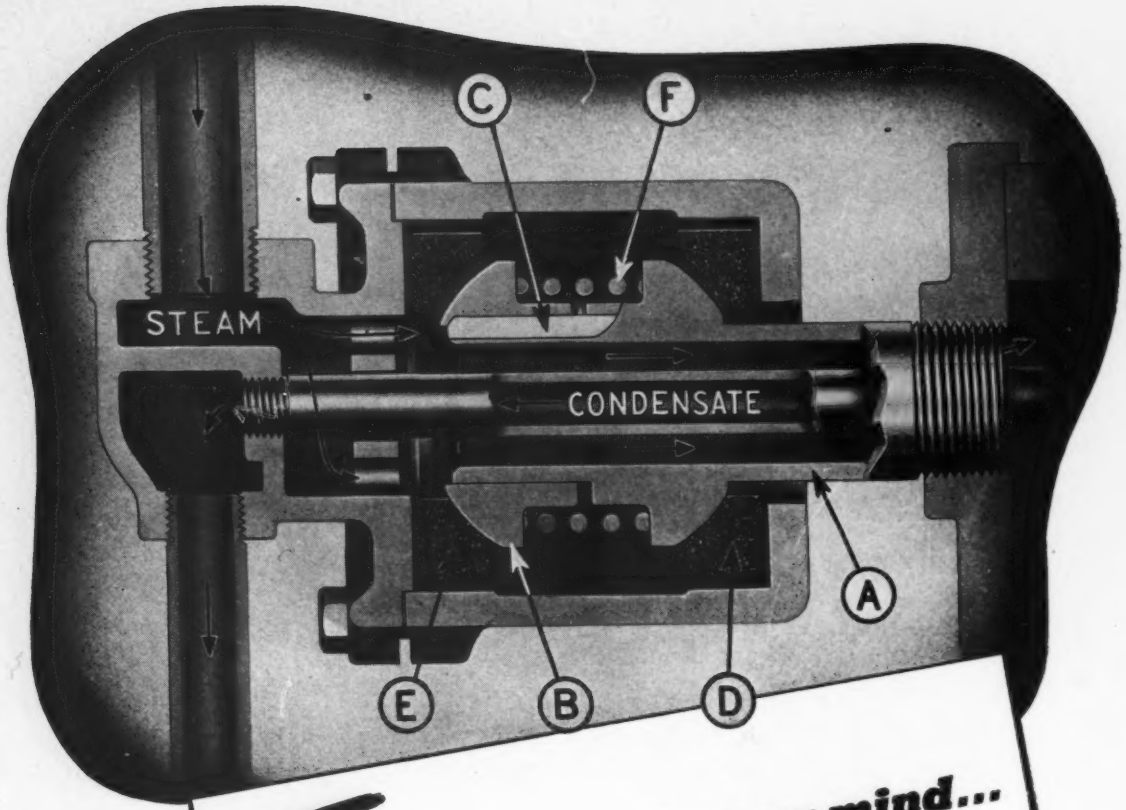
May we send you our new catalog, or may one of our engineers call?

SUTHERLAND REFINER CORPORATION

TRENTON, NEW JERSEY • *Manufactured in the United States by Valley Iron Works Co., Appleton, Wis*

SUTHERLAND REFINER LIMITED, 319 DRUMMOND BLDG., MONTREAL, P. Q. Manufactured in Canada by The John Bertram & Sons Co., Ltd., Dundas, Ontario

SUTHERLAND



Turn this over in your mind...

Get a clear picture of *how* the Johnson Joint works, see *what* it accomplishes, and you will understand why it has so completely outmoded all the old stuffing boxes and steam fits.

In actual operation you would see the parts marked (A) and (B) rotating with the roll or drum. These are the nipple and sliding collar, keyed to rotate together (C), but fitted together only loosely so pressure can fill the entire housing. You might see too the action of this pressure in forcing the carbon-graphite seal ring (D) tightly against the nipple to effect the seal.

Follow that much of the operation and you have basically the whole picture. The second carbon-graphite ring (E) serves as a bearing; the spring (F) is for initial seating only.

Now see how this simple design ends all the tinkering and servicing demanded by stuffing boxes. It has no packing whatsoever. It needs no oiling — the carbon-graphite rings are self-lubricating. It adjusts itself automatically for varying pressures. It minimizes danger of damage from misalignment, both angular and lateral. Note besides how neatly it provides for more efficient syphon drainage of rolls.

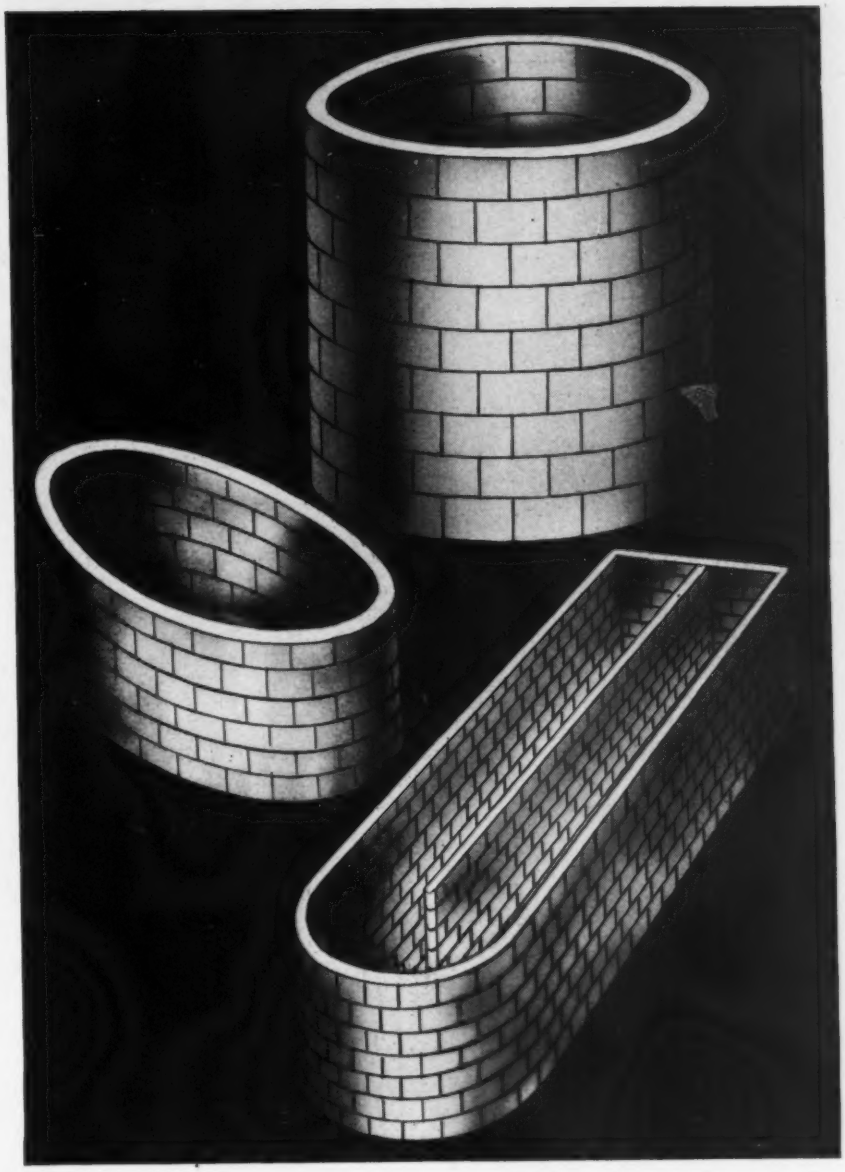
In immediate returns, the Johnson Joint brings savings in maintenance which alone will pay its cost in a short while. In the larger, more important, sense it reduces machinery shutdown and promotes overall plant efficiency out of all proportion to its size and cost. No wonder so many machinery manufacturers furnish Johnson Joints as standard equipment. No wonder industry has already purchased more than 100,000 Johnson Rotary Pressure Joints, in barely ten years.

Type B Joint illustrated above. Other types, sizes for all needs. Write for literature.

JOHNSON
Rotary Pressure
JOINTS

THE JOHNSON CORPORATION
828 WOOD STREET, THREE RIVERS, MICHIGAN

ANY SIZE *or* SHAPE *of* PAPER MILL TANK *or* CHEST *can be built with*



Kalamazoo GLAZED TILE

Consult our Engineers for ESTIMATES

Complete Erection Service

KALAMAZOO TANK & SILO COMPANY

Kalamazoo, Michigan : U.S.A.

MORDEN

MORDEN MACHINES CO.
PACIFIC BUILDING • PORTLAND 4, OREGON

IN ENGLAND
Millspaugh, Limited, Sheffield

IN CANADA
The William Kennedy & Sons, Ltd.
Owen Sound, Ontario

Get the Facts!

● **Our new booklet (MM200) just printed, gives you the full story of the MORDEN "Stock-Maker."**

If your copy hasn't reached you, let us know and we shall be glad to send one to you.

STOCK-MAKER
for Continuous beating and refining

EDERER

CRANES & HOISTS

Designed Expressly for the Pulp & Paper Industry

- LOG GRAPPLE CRANES
- LOG CANTING CRANES
- ROLL HANDLING CRANES
- HEAVY DUTY STAND-BY CRANES
- CALENDER CRANES
- MONORAIL HOISTS

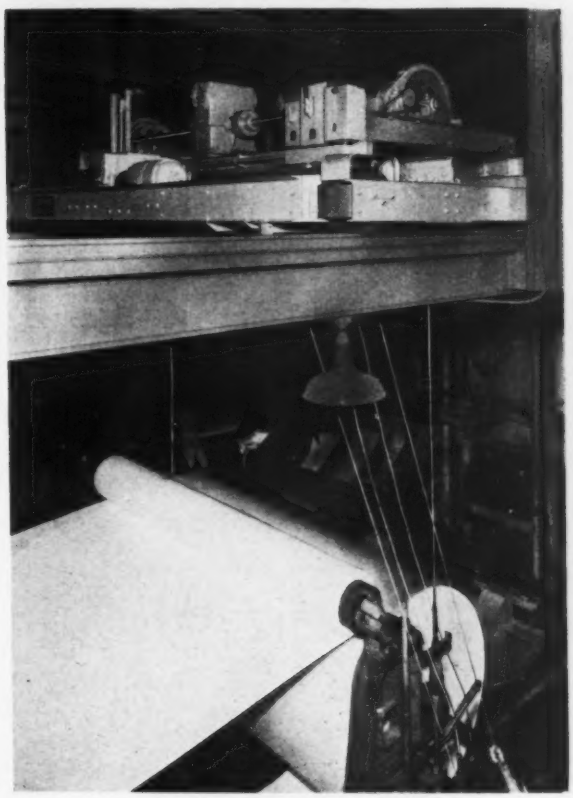
Ease of operation, dependability, efficiency, safety and economy are standard features of all EDERER CRANES.

- **All parts are easily accessible for inspection.**
- **All high speed gears are enclosed in oil tight cases.**
- **All high speed shafts are fitted with ball or roller bearings.**
- **All parts are designed with a safety factor of 5 or better.**

HIGH LIFT, LOW HEADROOM, ROLL HANDLING CRANE

TWO TROLLEY, HIGH LIFT, CALENDER CRANE

LOG CANTING CRANE



6 TON ROLL HANDLING CRANE

For over 47 years the Ederer Engineering Company has designed and manufactured special cranes and hoists for the Pulp and Paper Industry . . . A reliable background of experience to help you solve your materials handling problems in the most practical and economical way.

Send us your requirements and our engineers will make recommendations without obligation.

EDERER ENGINEERING COMPANY

2931 FIRST AVENUE SOUTH • SEATTLE 4, WASHINGTON

Good Going

History was ground out briskly in the year 1885. Grover Cleveland moved into the White House; Alfonso XII of Spain cashed in; Fanny Witherspoon set a two-mile trotting record in 4 minutes, 43 seconds; General Grant smoked his last cigar; Illinois Central hit 129; and Walt Whitman fell off his porch in Camden, N. J., and hurt himself.

Last, but—we'd have you know—not least, John Moore and J. Atwood White had themselves an order for four slitters, and embarked upon the business of making paper manufacturing accessories.

Would that we could report the flowering of this enterprise in all its colorful detail. How it weathered the blizzard of '88. How the infuriating story of the battleship *Maine* first screamed from newsprint made on Moore & White machines. How two world wars were auspiciously closed—also by benefit of Moore & White equipment—with confetti, ticker-tape, telephone directories, and other paper sundries heaved from lofty windows. . . .

Stories like these would hold you spellbound if we could document them—but we can't.

PRODUCTS MANUFACTURED BY THE MOORE & WHITE COMPANY:

Fourdrinier Paper and Paperboard Machines • Cylinder Paper and Paperboard Machines • Spiral Bevel Gear Drive Stands • Automatic Wire and Felt Guides • Wood Suction Box Covers • Steam Joints for Dryers • "Criss Cross" Shower Pipes • Upright, Revolving, and Pope Uniform Speed Reels • Agitators • Bellmar Bleachers • Pumps: Stuff, Suction, Centrifugal • Füllner Save-Alls • Wet Machines • Tar and Asphalt Saturators • Two-Drum and Four-Drum Winders • Two-Drum and Four-Drum Super Calender Rewinders • High-Speed Slitter Parts • Single and Duplex Rotary Sheet Cutters • Cutter Back Stands • Single and Duplex Automatic Lay Boys • Tar and Asphalt Coating Machines • Sheet Pasters • Friction Clutches and Speed Changes

Messrs. Moore and White kept no journals, indited no diaries, subscribed to no clipping bureaus.

They did keep ledgers, however, and the story they tell, to those with the skill and patience to interpret them, is good. In fact, darned good.

Those 63 years saw the infant enterprise grow to giant stature . . . witnessed the development of a reputation second to none in the industry. Throughout the length and breadth of the land, and in foreign parts, Moore & White machines —vintage and modern—are doing yeoman service in a world which literally runs on paper.

Today, Moore & White—with doubling of plant-capacity now in the works, and with an array of technical and production personnel unmatched in its history—offers outstanding equipment, service, and counsel to makers of paper and paperboard. Whether your needs embrace complete new assemblies, component machines, or replacement parts—or a rejuvenating and speeding-up of ageing equipment—call for a Moore & White sales-engineer. He has the answers to your problems . . . *all* of them.

The MOORE & WHITE Company

15TH STREET AND LEHIGH AVENUE • PHILADELPHIA 32, PA.

Custom-built machines for makers of paper and paperboard

MIDWEST AUTOMATIC PRECISION BEATERS

You'll get automatic hydration control—that and more, too, from the day you install a Midwest Automatic Precision Beater.

Identical hydration of each succeeding furnish as per setting of the controls. Faster hydration, hence shorter time cycle. Less power. Less floor space. Less labor. Low maintenance.

Why clutter up the place with four or five ordinary beaters when just one Midwest Automatic Precision Beater will hydrate a like amount of stock?

Why worry along with a lot of rumbling, power-wasting, ordinary beaters when just one Midwest Automatic will run so much smoother, take so much less power for circulation, utilize so much more of the input for productive work, and net a big over-all power saving per ton of stock hydrated?

Why operate beaters that are almost always in need of some repair? A Midwest Automatic rarely requires any attention at all.

Big statements! Strong claims! Certainly are—and the Midwest Automatic Precision Beater Data Book should prove every last one of them to your satisfaction.

FULTON DRYER DRAINAGE

CLOSE TO 75% OF ALL PAPER MACHINES ARE EQUIPPED WITH FULTON SYSTEMS

Why? Because Fulton dryer drainage systems accomplish the following, and usually pay for themselves the first year:

1. **Increase drying capacity from 10% to 30%.**
2. **Provide close control of the moisture content.**
3. **Save from 10% to 20% of the steam required for drying.**
4. **Return condensate to boiler at maximum temperatures.**
5. **Eliminate cockling, curling, case hardening due to improper drying.**
6. **Prevent over-drying of the sheet.**
7. **Reduce broke losses and machine down time.**

If not already operating with a Fulton System, you're passing up a lot of advantages and economies.

Drop us a line.

ALSO MANUFACTURERS OF:

MIDWEST HIGH-DENSITY PULPERS
STANDARD BEATERS, CHEST DESIGNS
AGITATORS, CLAY, STARCH AND COLOR BLENDERS
STEAMTRAPS, DRYER SYPHONS, BALL SIGHT-FLOW INDICATORS FOR DRYERS

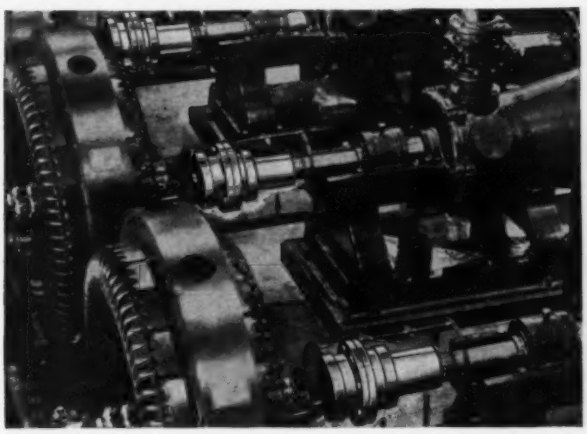
MIDWEST-FULTON

MIDWEST-FULTON MACHINE CO., DAYTON 1, OHIO

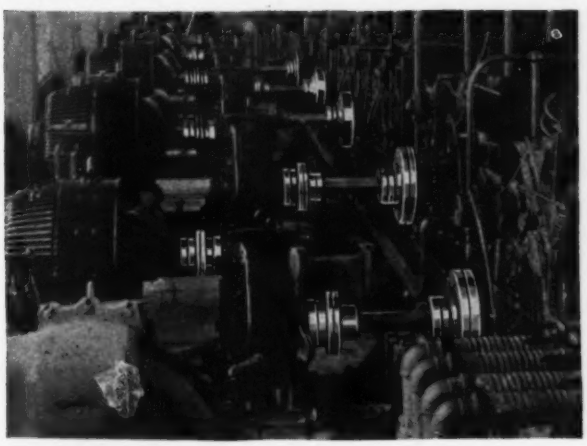
How to Get

Uninterrupted Power Transmission for All Paper Mill Drives!

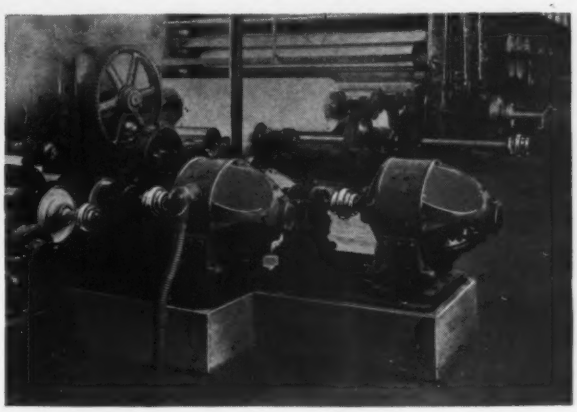
SPECIFYING Fast's self-aligning Couplings is the answer! No matter what your coupling problem, there's a Fast's made to solve it . . . and give you longer machine life, lower upkeep costs and minimum shut-down losses. For absolute dependability, these *original* gear-type couplings are built with many important features . . . such as an *exclusive* "rocking bearing." This bearing is *exclusive* in providing a positive metal-to-metal seal against wear-producing moisture, dust and grit. The bearing is also exclusive in its correctly engineered position which allows *freedom of movement* to compensate for misalignment because its *spherical* base has *the same axis* as the hub spline faces. And as a plus, Fast's Couplings give you the benefits of years of top engineering experience, Koppers' high standard of workmanship and unexcelled coupling service which assures spare parts no matter how old your couplings may be. For full information, mail the coupon below to: Koppers Co., Inc., Fast's Coupling Dept., 380 Scott St., Baltimore 3, Md.



FOR JORDAN ADJUSTMENTS—Fast's Jordan-Type Couplings reduce wear on bearings, prolong life of motor and Jordan. Because the Fast's splines are meshed in oil, plug adjustment is smooth and certain. No worn spots can develop. The customary "hard spot" is eliminated. Due to smooth torque and elimination of coupling vibration, Jordan lining life is increased and the product discharged from the Jordan is uniform.



FOR REMOTE DRIVES—Fast's Floating Shaft Couplings enable drives to be set back from paper machines without the use of supporting bearings. This eliminates one piece of equipment—does away with the necessity of keeping three or more bearings in line—saves installation cost and eliminates upkeep, attention and replacement of bearings.



FOR STANDARD APPLICATIONS—Fast's Standard Couplings are designed for use on all ordinary installations. They are made in shaft sizes from 1½" to 5".

K KOPPERS

FAST'S *self-aligning* COUPLINGS

SEND FOR FREE CATALOG!

Gentlemen: Please send me your illustrated, informative catalog, giving full information on the many types of Fast's Couplings.

Name .....

Company .....

Street .....

City ..... Zone ..... State .....

From Pulpit to Paper Mill

The first paper mill in America was built in 1690 by William Rittenhouse, a Mennonite preacher, from Amsterdam. The mill was situated on a little creek in what is now Fairmount Park in Philadelphia.

Linen rags — the product of flax which was raised in the vicinity — supplied the raw material, and the paper was said to be of excellent quality. Rittenhouse employed four men to do the work. The man in the picture is shaking pulp in a hand mold, forming the rough sheet of paper.

Today there are nearly a thousand mills in the country, producing annually more than 17 million tons of pulp and paper. The bearings they use . . . in their grinders, their cylinder molds, their press rolls, their driers . . . are in many cases supplied by SKF who pioneered in the paper industry. Mill executives and production engineers have come to rely more and more on SKF Anti-friction Bearings to improve efficiency and reduce operating costs.

Since SKF makes many types of ball and roller bearings, an SKF engineer can give you expert help in selecting

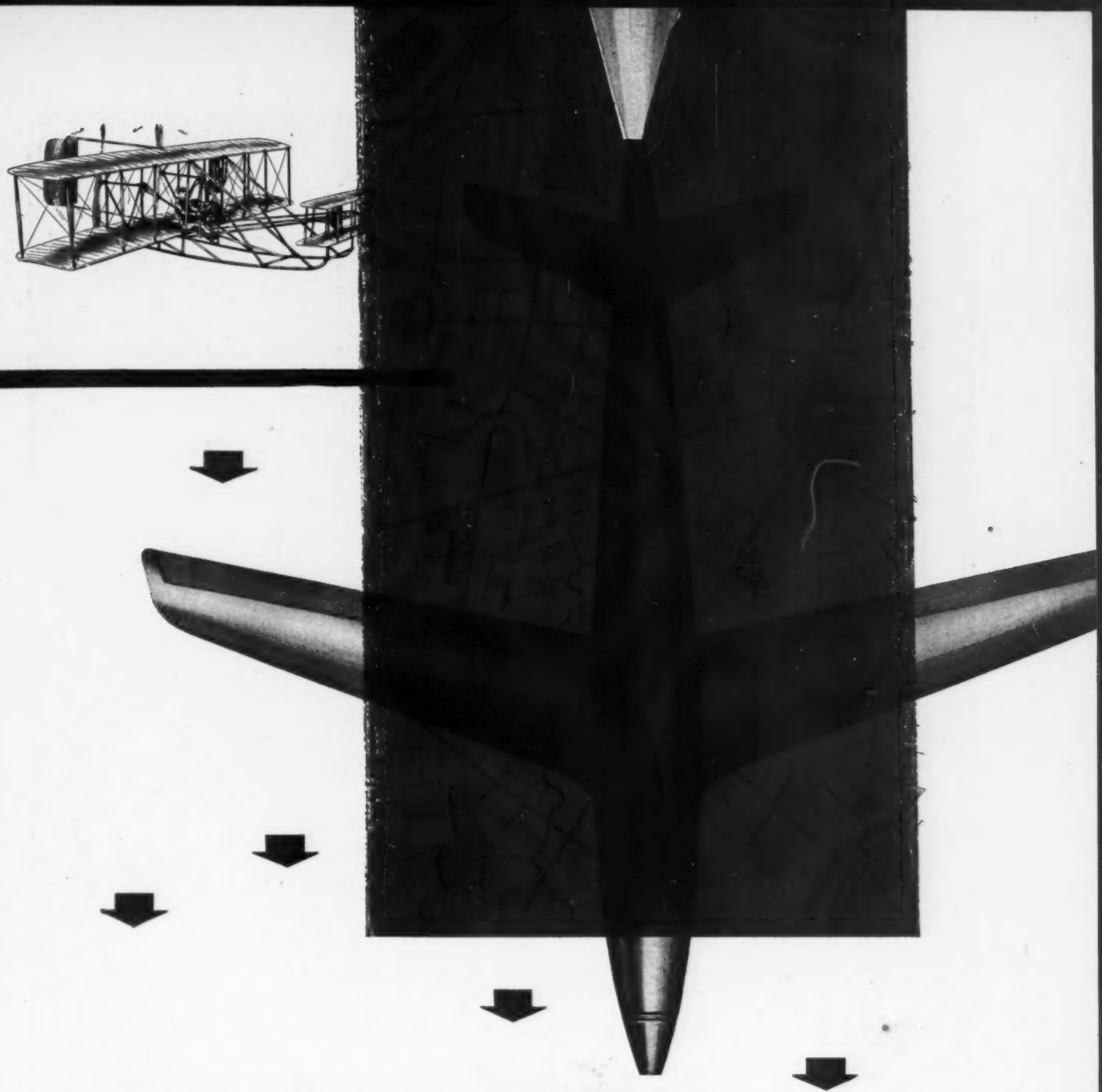
THE RIGHT BEARING FOR THE RIGHT PLACE

SKF

BALL AND ROLLER BEARINGS

7002-A

SKF INDUSTRIES, INC., PHILA., PA.



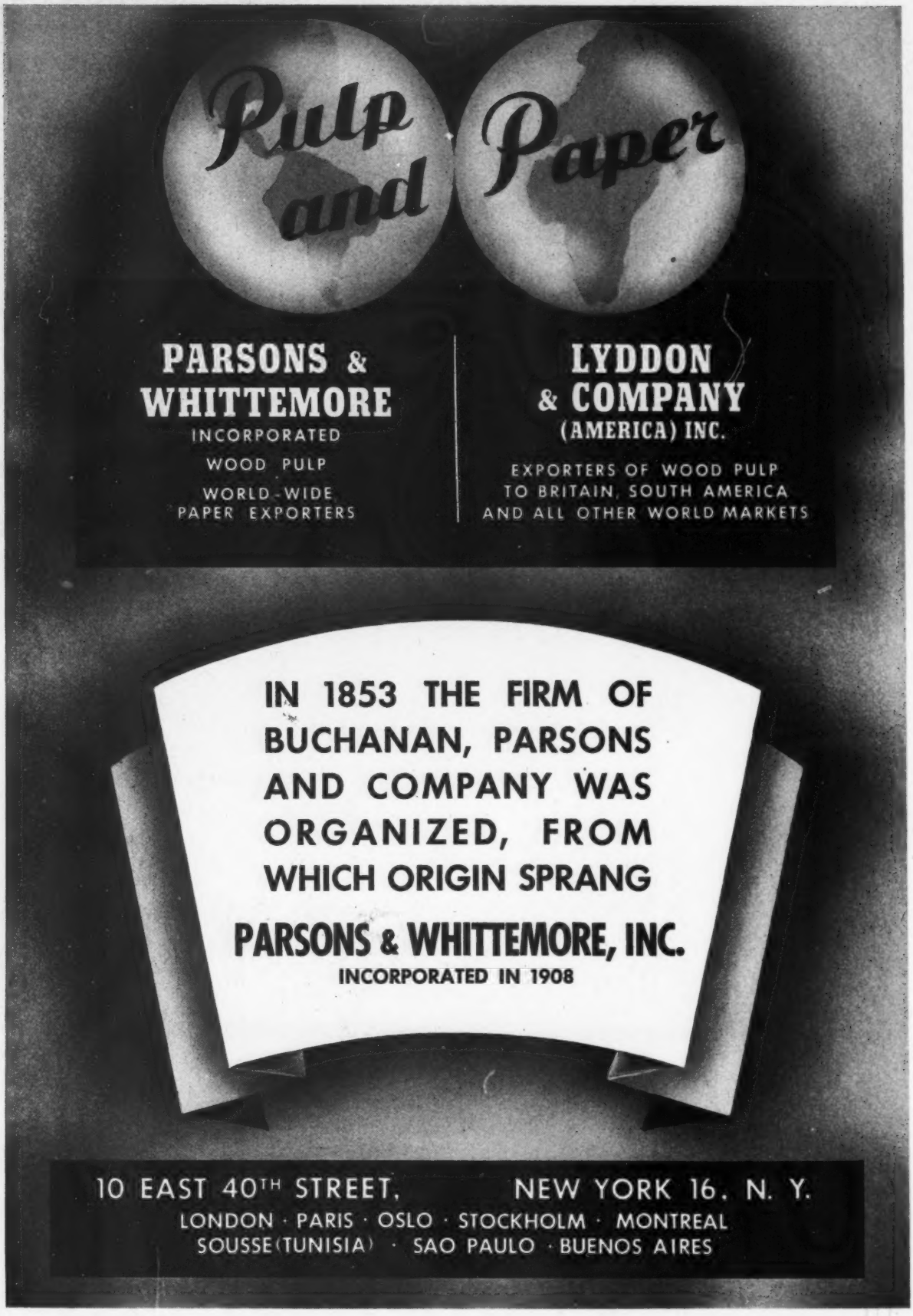
from kitty hawk to supersonics

It took a lot of pioneering groundwork in aerodynamics to lift the first "box kite" into the air . . . and on that groundwork planes now fly at supersonic speeds. Thus is progress in every field of science and industry an extension of sound pioneering thought and action. Niagara pioneered the production of many electro-chemical products in America and through research has constantly improved their quality and efficiency as chemical tools of progress, with the result that Niagara is today "An Essential Part of America's Great Chemical Enterprise."

NIAGARA ALKALI COMPANY

60 East 42nd Street, New York 17, N. Y.

LIQUID CHLORINE • CAUSTIC POTASH • CARBONATE OF POTASH • PARADICHLOROBENZENE • CAUSTIC SODA • NIAGATHAL (TETRACHLORO PHTHALIC ANHYDRIDE)


Pulp and Paper
PARSONS & WHITTEMORE
INCORPORATED
WOOD PULP
WORLD-WIDE
PAPER EXPORTERS
LYDDON & COMPANY
(AMERICA) INC.
EXPORTERS OF WOOD PULP
TO BRITAIN, SOUTH AMERICA
AND ALL OTHER WORLD MARKETS
IN 1853 THE FIRM OF
BUCHANAN, PARSONS
AND COMPANY WAS
ORGANIZED, FROM
WHICH ORIGIN SPRANG
PARSONS & WHITTEMORE, INC.
INCORPORATED IN 1908
10 EAST 40TH STREET, NEW YORK 16, N. Y.
LONDON · PARIS · OSLO · STOCKHOLM · MONTREAL
SOUSSE(TUNISIA) · SAO PAULO · BUENOS AIRES

——————high speed Production

Well in Hand!

GAIRanteed folding cartons are endowed with a recognized two-fold LEADERSHIP . . .

LEADERSHIP for outstanding performance on high speed production lines.

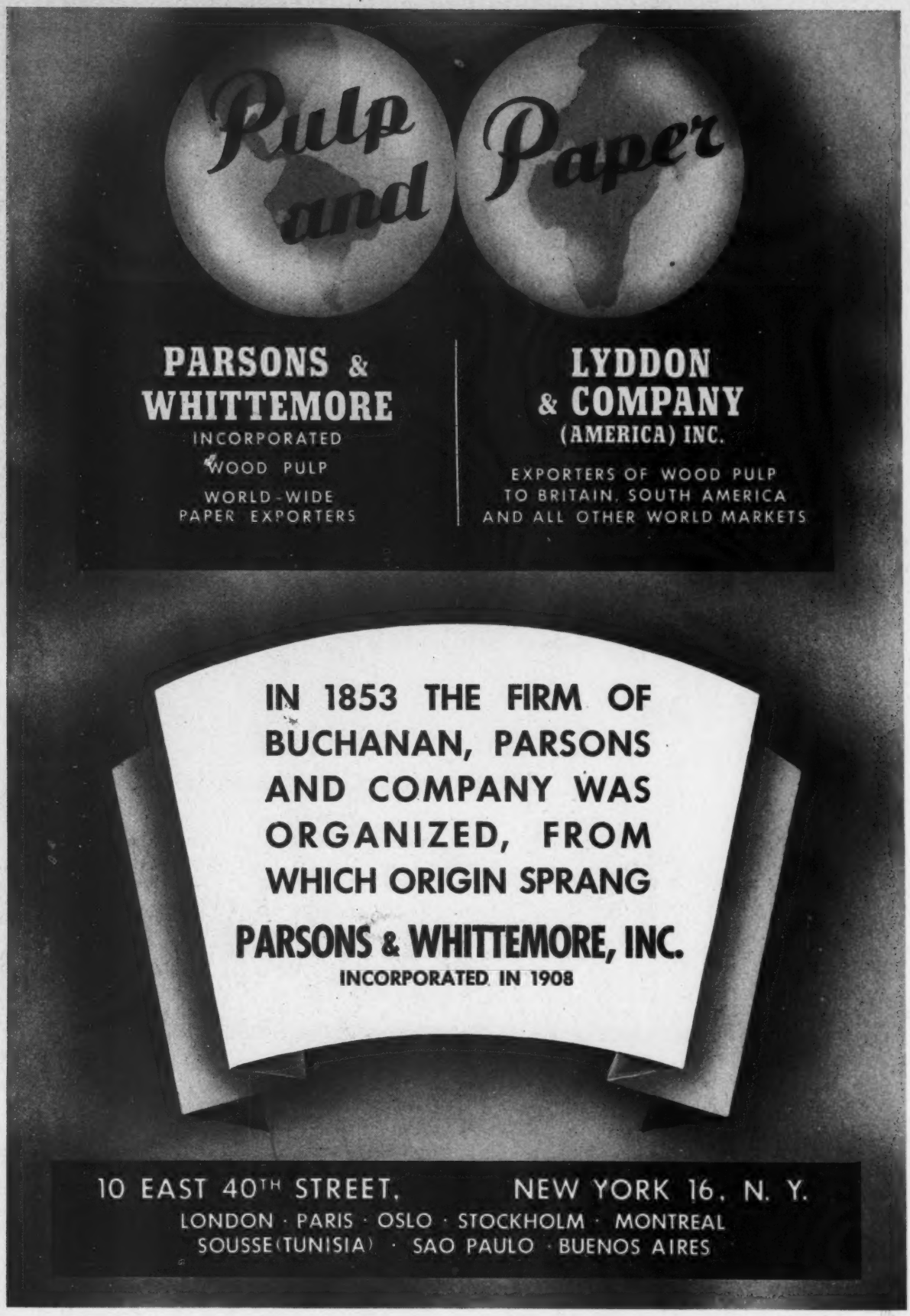
LEADERSHIP for winning commanding attention of buyers in highly competitive retail markets.

Precision and design problems entrusted to GAIR are always "WELL IN HAND".

Write for informative booklet on PRECISION PACKAGING

GAIR

ROBERT GAIR COMPANY, INC., NEW YORK, TORONTO • PAPERBOARD, FOLDING CARTONS, SHIPPING CONTAINERS


Pulp and Paper
PARSONS & WHITTEMORE
INCORPORATED
WOOD PULP
WORLD-WIDE
PAPER EXPORTERS
LYDDON & COMPANY
(AMERICA) INC.
EXPORTERS OF WOOD PULP
TO BRITAIN, SOUTH AMERICA
AND ALL OTHER WORLD MARKETS
IN 1853 THE FIRM OF BUCHANAN, PARSONS AND COMPANY WAS ORGANIZED, FROM WHICH ORIGIN SPRANG
PARSONS & WHITTEMORE, INC.
INCORPORATED IN 1908
10 EAST 40TH STREET, NEW YORK 16, N. Y.
LONDON · PARIS · OSLO · STOCKHOLM · MONTREAL
SOUSSE(TUNISIA) · SAO PAULO · BUENOS AIRES

——————high speed Production

Well in Hand!

GAIRanteed folding cartons are endowed with a recognized two-fold LEADERSHIP . . .

LEADERSHIP for outstanding performance on high speed production lines.

LEADERSHIP for winning commanding attention of buyers in highly competitive retail markets.

Precision and design problems entrusted to GAIR are always "WELL IN HAND".

Write for informative booklet on PRECISION PACKAGING

GAIR

ROBERT GAIR COMPANY, INC., NEW YORK, TORONTO • PAPERBOARD, FOLDING CARTONS, SHIPPING CONTAINERS

CHEMIPULP PROCESS

CHEMICAL PULP MILL ENGINEERS

SULPHITE ALKALINE SEMICHEMICAL

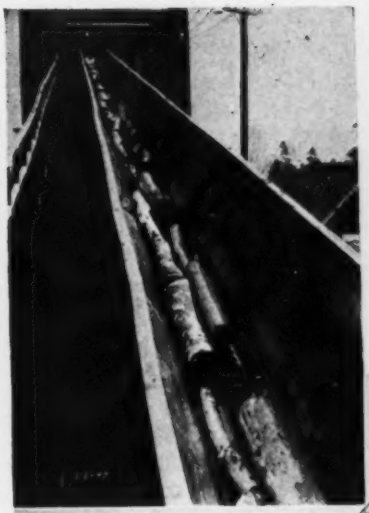
DESIGN SERVICES—PLANT AND EQUIPMENT
CONSULTATION AND ESTIMATES
START-UP SERVICES
OPERATING REPORTS

SPECIALIZING IN:

- DIGESTER CIRCULATING SYSTEMS
- CHIP DISTRIBUTION FOR DIGESTERS
- RECOVERY SYSTEMS
- HOT ACID SYSTEMS
- INDEPENDENT SO_2 RECOVERY SYSTEMS
- ACID PLANTS:
  - SULPHUR BURNING SYSTEMS
  - SPRAY TYPE SO_2 GAS COOLERS
  - SO_2 GAS FORTIFYING SYSTEMS
  - ACID MAKING SYSTEMS

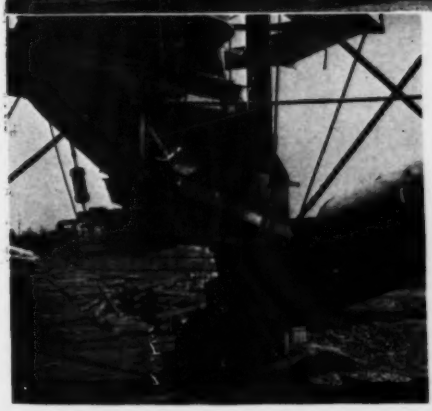
CHEMIPULP PROCESS INC.
WATERTOWN, N.Y.

CHEMIPULP PROCESS LTD.
403 CRESCENT BLDG.
MONTREAL, CANADA.



MATERIAL HANDLING FROM START TO FINISH

Whether it's pulpwood, chips, salt cake, rags, bagasse, straw, pulp logs, paper rolls, packages of paper or boxes, the Jeffrey line has the proper

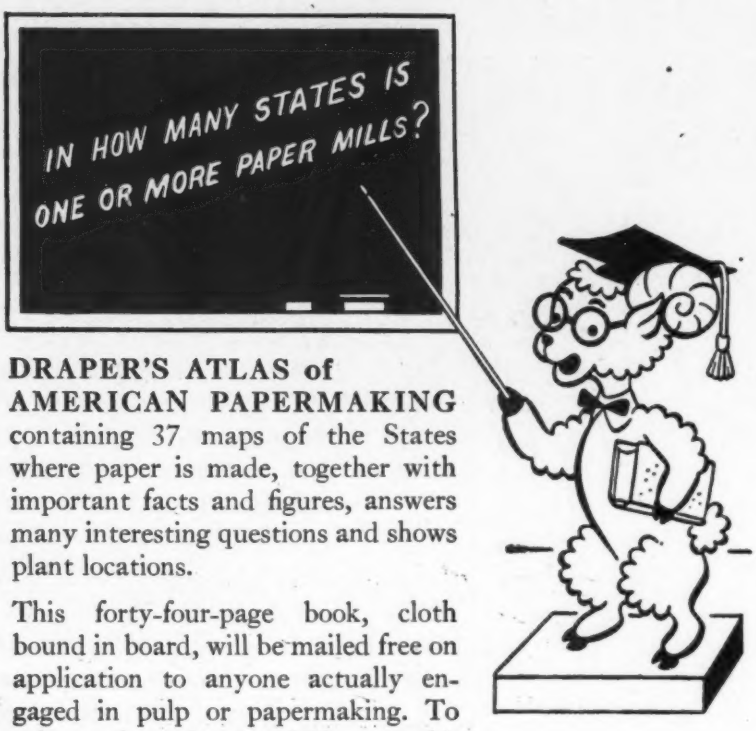


THE JEFFREY MFG. CO.

331-99 North Fourth Street, Columbus 16, Ohio

Baltimore 2	Buffalo 2	Cleveland 13	Norfolk	Jacksonville 2	Pittsburgh 22
Birmingham 3	Chicago 1	Denver 2	Houston 2	Milwaukee 2	St. Louis 3
Boston 10	Cincinnati 2	Detroit 13	Huntington 19	New York 7	Salt Lake City 1
				Philadelphia 2	Scranton

What do you know about Paper?



DRAPER'S ATLAS of AMERICAN PAPERMAKING containing 37 maps of the States where paper is made, together with important facts and figures, answers many interesting questions and shows plant locations.

This forty-four-page book, cloth bound in board, will be mailed free on application to anyone actually engaged in pulp or papermaking. To others, the price is $2.00 postpaid, while the edition lasts.

The DRAPER Felt

DRAPER BROTHERS COMPANY

Woolen Manufacturers Since 1856

CANTON, MASSACHUSETTS

Ralph E. Briggs, *Sales Manager*

BRADFORD WEST
Pittsfield, Mass.

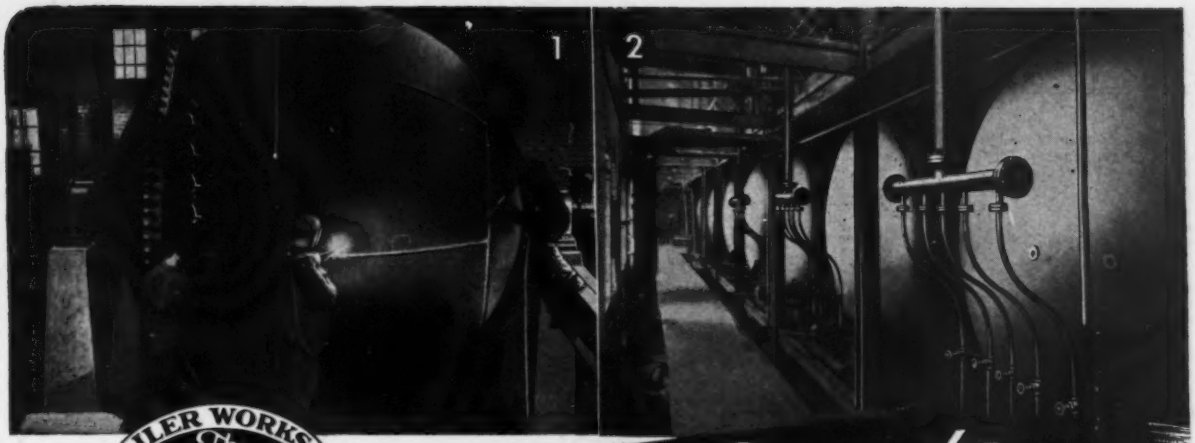
WILLIAM N. CONNOR, Jr.
Canton, Mass.

L. H. BREYFOGLE
Kalamazoo, Mich.

WALTER A. SALMONSON
519-20 White Bldg., Seattle, Wash.

L. L. GRIFFITHS, Jr.
Kalamazoo, Mich.

Answer to Question No. 1: Paper is made in 37 States of the Union



The Biggs BOILER WORKS CO. EST. 1887 AKRON OHIO U.S.A.

Biggs Digesters . . .

STANDARD EQUIPMENT FOR OVER 50 YEARS

Fig. 1—Biggs 14 ft. dia. welded rotary digester with worm-and-segment drive. *Fig. 2*—nine 14 ft. x 40 ft. sulphite digesters; weight, 65 tons each.

Fig. 3—cylinder rotary bleaching boilers available in all sizes and with various types of drives.

SINCE 1887 Biggs globe and cylinder rotary as well as stationary digesters have been universally used in the paper industry. These units are furnished in all sizes; are made from carbon or alloy steels for various working pressures with drives, linings and fittings to suit individual processes. Biggs "rotary boilers" are most versatile and economical in cooking, bleaching and otherwise processing a wide range of materials for standard and special operations. Units installed by Biggs in 1890 are still in daily operation with a minimum of maintenance. Biggs maintains a competent erecting organization. *Write for Bulletin 45.*

Biggs' modern plant facilities permit the fabrication of pressure vessels, welded tanks, pipe lines, stacks and other types of plate work.

Fig. 4—laboratory digester 8" x 18" with chain drive; working pressure, 250 lbs. Can be had in various sizes.

Fig. 5—experimental rotary digester made of nickel-clad steel. Units available in sizes from 30" to 72" dia. for various working pressures; fittings as required. →

BIGGS-WELD STRONGER THAN THE PLATE ITSELF EST. 1887

THE Biggs BOILER WORKS CO.

1007 BANK STREET • AKRON 5, OHIO, U.S.A.

P-426 BECKAMINE

The Wet-Strength Resin • Outstanding in Stability

•

P-364A BECKAMINE

For Clay Coatings . . . Tub-Size Applications with Starch
For Water-Proofing Starch Adhesives

•

NO. 5013 PLYOPHEN

For Fast-Curing, Low Pressure Molding of High Strength Papers
and for Pulp Sheet Overlay

•

PLASTICIZING RESINS

For Lacquer Coatings

•

RESINOUS COMPONENTS

For Hot Melt and Grease-Resistant Coatings

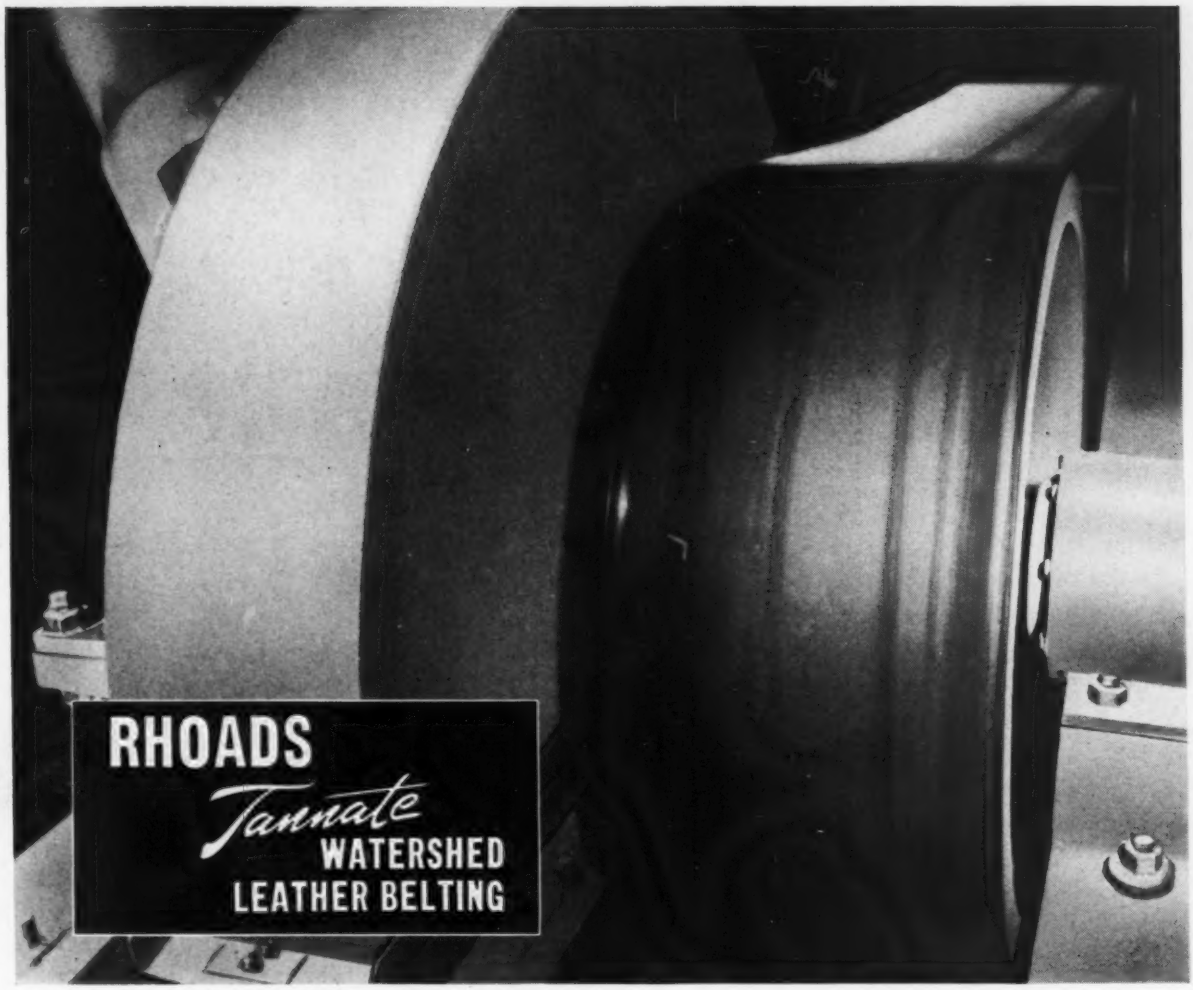
•

CHEMICAL PIGMENT COLORS

REICHHOLD CHEMICALS, INC.

General Offices and Main Plant, Detroit 20, Michigan

Other Plants: Brooklyn, New York • Elizabeth, New Jersey • Seattle, Washington
South San Francisco, California • Tuscaloosa, Alabama
Liverpool, England • Paris, France • Sydney, Australia
Rio de Janeiro, Brazil • Milan, Italy • Zurich, Switzerland



INCREASES PRODUCTION...LOWERS COSTS

In MORE and MORE paper and pulp mills (OLD and NEW) all over the country, performance records are proving that TANNATE Leather Belts increase production . . . lower costs. Rhoads TANNATE Leather Belts have HIGH POWER TRANSMITTING CAPACITY . . . keep machines running at full load; they TRANSMIT FULL LOAD EVEN WHEN DAMP . . . withstand high temperatures, water, machine oil and many chemicals; are STRONGER THAN MOST OAK BELTS . . . *stay on the job longer, and require less attention.* Write for detailed information.

HYDRAULIC PACKINGS AND OTHER MECHANICAL PRODUCTS

PRODUCERS OF FINE LEATHER FOR 246 YEARS

J. E. RHOADS & SONS

35 NORTH SIXTH ST., PHILA. 6, PA.

NEW YORK • CHICAGO • ATLANTA

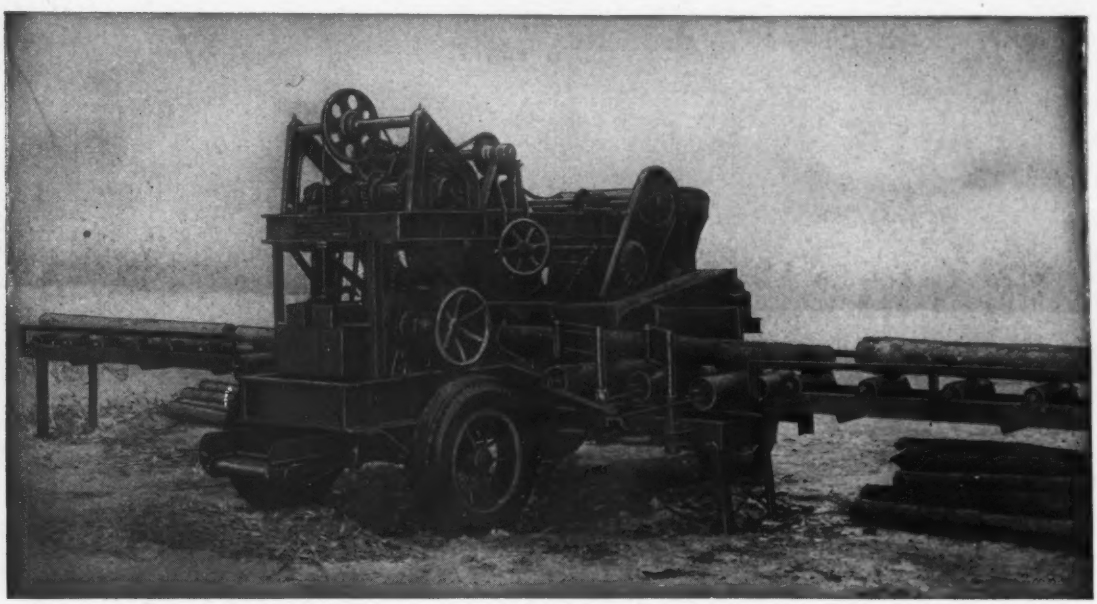
. . . are you concerned with the production

. . of more peeled pulp wood at lower cost?

if so you should investigate the merits of the—

Nekoosa Portable Wood Peeler

it is meeting with wider acceptance daily



THIS is an era of change—along with the "New Look" we have the "New Way"—the Nekoosa Peeler way. The Nekoosa Portable Wood Peeler offers pulpwood producers "the new way" of peeling pulpwood—more efficiently and more economically; effecting savings in wood, labor and freight.

Machine handles practically all species of pulpwood—hard wood exceptionally well.

Ideal for peeling fence posts before preservative treatment.

Write us for particulars.

Nekoosa Foundry & Machine Works Inc.

Nekoosa, Wis.

Other Products

Bark Press	**Chip Cutter**	**Washers**
Flat Screens	**Agitators**	**Digester Fittings**
Ball Valves	**Deckers**	**Press Marking Equipment**

Columbia, with its affiliate, Southern Alkali Corporation, is the nation's largest merchant producer of chlorine... and a leading manufacturer of soda ash, caustic soda and other alkalies.

PITTSBURGH PLATE GLASS COMPANY
COLUMBIA CHEMICAL DIVISION
FIFTH AVENUE AT BELLEFIELD • PITTSBURGH 13, PA.
Chicago • Boston • Cleveland • New York • Cincinnati • St. Louis • Minneapolis • Philadelphia
Charlotte • San Francisco

PAINT • GLASS • CHEMICALS • BRUSHES • PLASTICS

PITTSBURGH PLATE GLASS COMPANY

LOROCO INDUSTRIES, INC.

Makers and Shapers of Papers

Half-a-Century *serving Industry* with Unusual Fabricated PAPER PRODUCTS

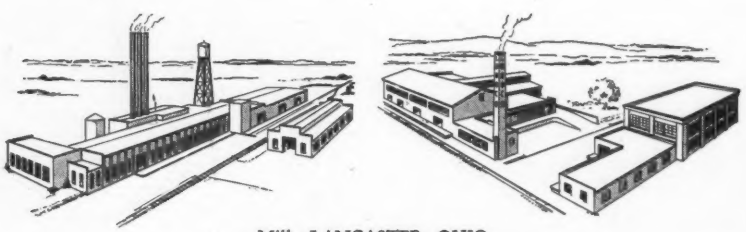
SINCE 1897 Loroco has been producing an unlimited variety of special paper and paper-board items for industry, in an infinite range of sizes and shapes, die-cut, stamped, drawn, punched, formed, rolled, laminated—plain, printed, colored, coated or impregnated.

Loroco's output is sold through paper jobbers, on inquiries referred by paper salesmen who contact industrial accounts. Paper salesmen have profited through observing Loroco's slogan: *Whatever your customer produces, some part of his product or packaging can be made better or more efficiently by LOROCO.*

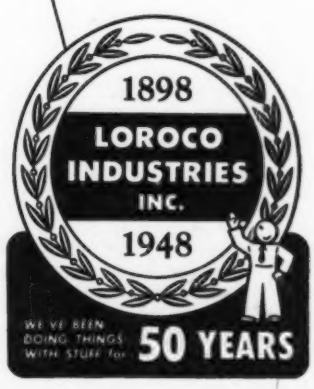
Inquiries for samples, quotations or information are always welcome.

Some of the Industries served by Loroco with specially made component or accessory items:

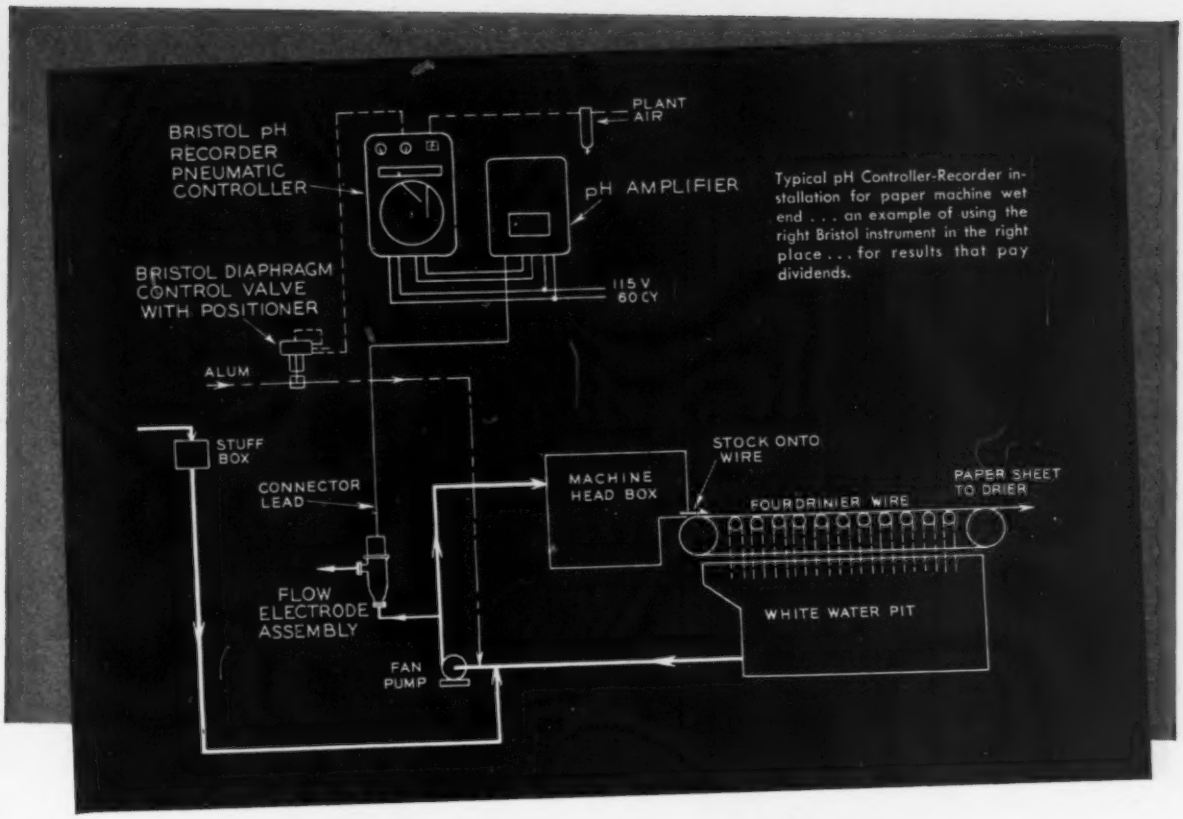
ADVERTISING DISPLAYS AND SPECIALTIES
AUTOMOTIVE
AVIATION
BAKING
BEVERAGE
BRICK AND TILE
BUILDING AND CONSTRUCTION
CASKETS
CLOTHING
ELECTRICAL EQUIPMENT
FLOOR COVERINGS
FOOD PRODUCTS
FURNITURE
GREETING CARDS
HARDWARE
HOME DECORATIONS
LAUNDRY AND DRY CLEANING
MEAT PACKING
PAINT
PLATE GLASS
PLUMBING FIXTURES
PHONOGRAPH RECORDS
PHOTOGRAPHIC EQUIPMENT
RADIO AND TELEVISION
RUBBER
SANITARY SUPPLIES
SHOE MANUFACTURING
TEXTILE
TOYS AND GAMES
WAREHOUSING



Mill—LANCASTER, OHIO
Converting Plant—READING, OHIO



General Offices—Benson at Second, Reading 15, Ohio



Typical pH Controller-Recorder installation for paper machine wet end . . . an example of using the right Bristol instrument in the right place . . . for results that pay dividends.

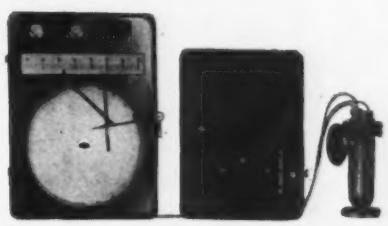
"HOW MUCH ALUM?"

. . . *The RIGHT Answer is Continuous Automatic pH Control*

When a Bristol pH Controller-Recorder takes over the addition of alum at the fan pump, you get:

Uniform operation under close control • Uniform product • Less waste . . . especially on high speed machines • More economical use of alum • Reduced corrosion.

Automatic control of pH also pays dividends in water treatment . . . continuous pulp washing . . . bleaching. *pH Controller-Recorders are in stock for immediate delivery.* For more facts write for Bulletin pH1302. THE BRISTOL COMPANY, 148 Bristol Road, Waterbury 91, Conn. (The Bristol Co. of Canada Ltd., Toronto, Ontario, Bristol's Instrument Co. Ltd., London N. W. 10, England.) West Coast: *Branch Factory* — 40 Berry St., San Francisco 7, Cal. *Branch Office* — White Building, Seattle 1, Wash. Lake Region: *Branch Factory & Office* — 351 East Ohio St., Chicago 11, Ill. Southern States: — *Branch Office* — Comer Building, Birmingham 3, Alabama.

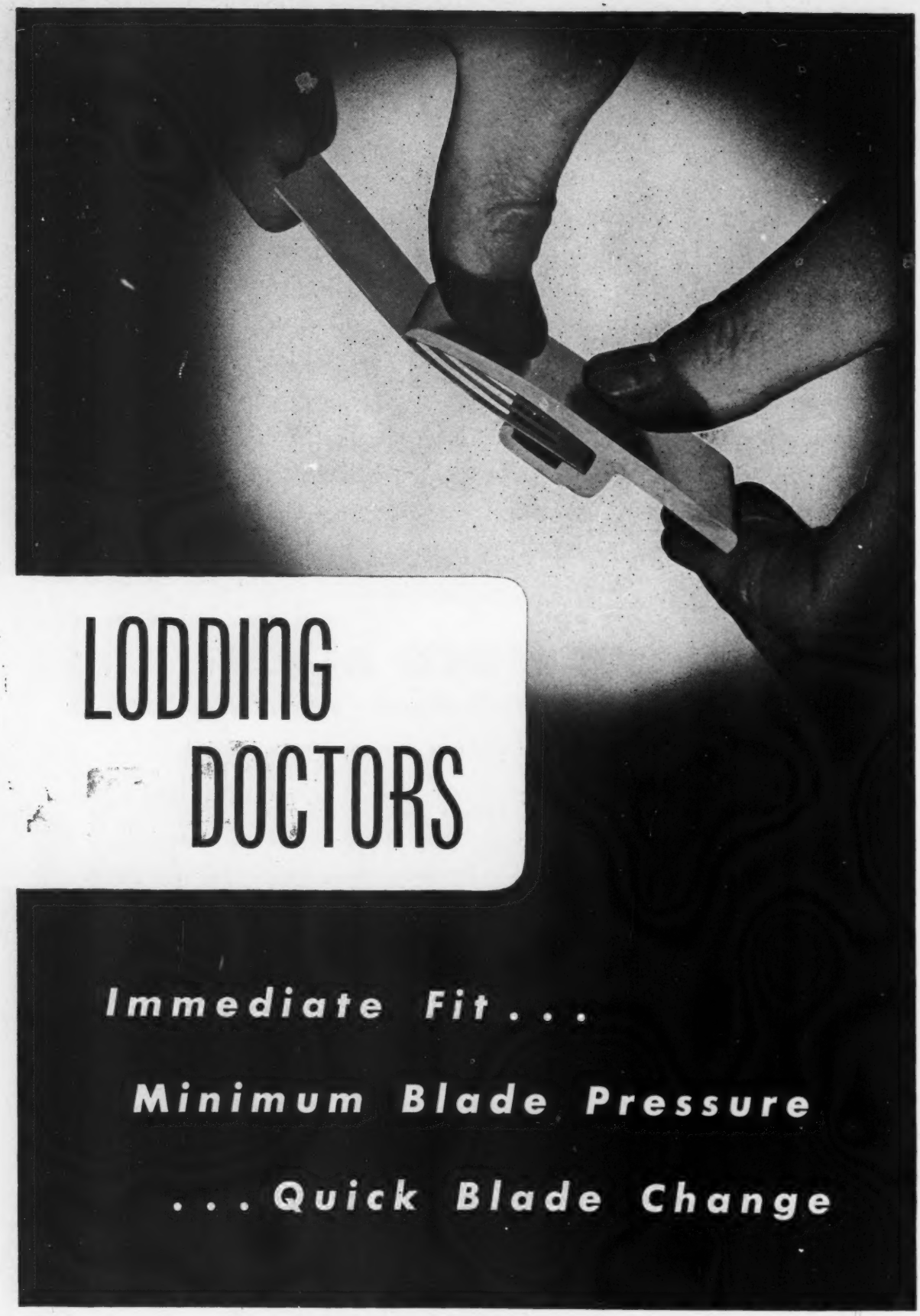


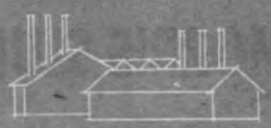
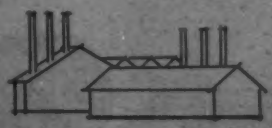
Air-operated Continuous pH Controller (with exclusive Free-Vane principle), amplifier unit, electrode assembly. Rugged, vibration-proof construction . . . precision potentiometer measuring system . . . throttling range and automatic reset adjustment.

IMMEDIATE DELIVERY — Bristol has hundreds of Recording and Controlling Instruments as well as Pyrometers and Thermocouples *in stock* for immediate delivery. Send for Bulletin W1811, Stock Instruments and P1235, Thermocouples and Pyrometer Accessories.

Engineers process control for better products and profits

AUTOMATIC RECORDING AND CONTROLLING INSTRUMENTS


LODDING
DOCTORS
Immediate Fit . . .
Minimum Blade Pressure
. . . Quick Blade Change

in

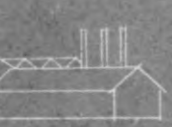
new

paper mills

the

trend

is to



HERCULES **size**

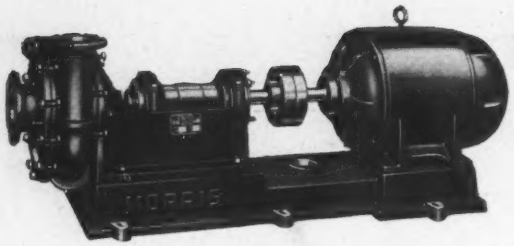
Those new paper mills springing up around the country are the last word in engineering, machinery, and technology. While one new plant may differ slightly from another, collectively they indicate the trend to Hercules size in today's paper-making. A new paper mill deserves the *best*. That's why the modern trend is to Hercules size—a quality product backed by helpful technical service.

HERCULES

SIZING MATERIALS AND CHEMICALS FOR PAPER

HERCULES POWDER COMPANY

961 King Street, Wilmington 99, Delaware



BLACK LIQUOR FLOWS MORE FREELY with MORRIS SLURRY PUMPS

1. Morris Black Liquor Pumps are hydraulically and mechanically designed for the express purpose of handling liquors containing solids.

2. Wearing parts are actually twice as thick as in conventional clear-liquid pumps.

3. The use of corrosion- and abrasion-resisting alloys in this pump is not entirely an expedient to lengthen the life of an otherwise unsuitable design, but a true means of augmenting the life period of *an inherently long-enduring unit.*

4. Morris Black Liquor Pumps were designed by Morris Engineers who have been meeting various material-handling requirements for 82 years.

Since 1864 —for more than 83 years—Morris Engineers have served the Paper Industry with the finest centrifugal pumps in the world. Unequalled in design. Unequalled in performance. Unequalled in durability and low-cost maintenance.

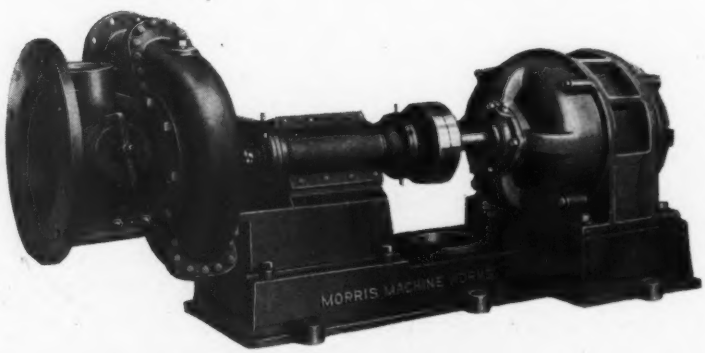
Whatever your requirements, we have the pump. And if you have a special pumping problem, our Engineers will be glad to recommend the exactly right pump for your needs. If necessary, design and build it from scratch. Write anytime for free recommendations.

SIMPLE DESIGN Means . . .

- SMOOTHER FLOW
- FEWER SHUT-DOWNS
- LONGER SERVICE

MORRIS Centrifugal STOCK PUMPS

1. Less dehydration
2. More uniform flow without clogging or air binding
3. Reduced air-entrainment losses
4. Large reserves of excess capacity
5. Output more closely constant under varying heads.



MORRIS MACHINE WORKS *Baldwinsville, N. Y.*
Sales Offices in Principal Cities

MORRIS *Centrifugal Pumps*

SERVING INDUSTRY THROUGH PROGRESS

"K" CHEMICALS AND PROCESSES

•

DE-INKING **DE-COLORIZING**

"K-140"

"K-121-B"

"K-DE-INKING"

"TECHNICAL SERVICE"

THE KINSLEY CHEMICAL COMPANY

4538 WEST 130TH STREET **CLEVELAND 11, OHIO**

TITANOX . . . *the brightest name in titanium pigments*

"Show-Through" is through when TITANOX comes in

There isn't room for this "show-through" spook in paper. That's why paper makers use TITANOX pigments. These titanium dioxide pigments impart the utmost attainable degrees of opacity, whiteness and brightness, and minimize "show-through". Paper takes on a more attractive appearance. Customers work without fear of print showing through. And you know how such desirable paper stock is easier to sell!

Due to the effectiveness of these pigments, the TITANOX line continues in greater demand than the output. To meet this demand, production is being increased as rapidly as possible. In the meantime, our Technical Service Laboratory can show you how to get the most out of your available supply. This help is yours by contacting our nearest office.

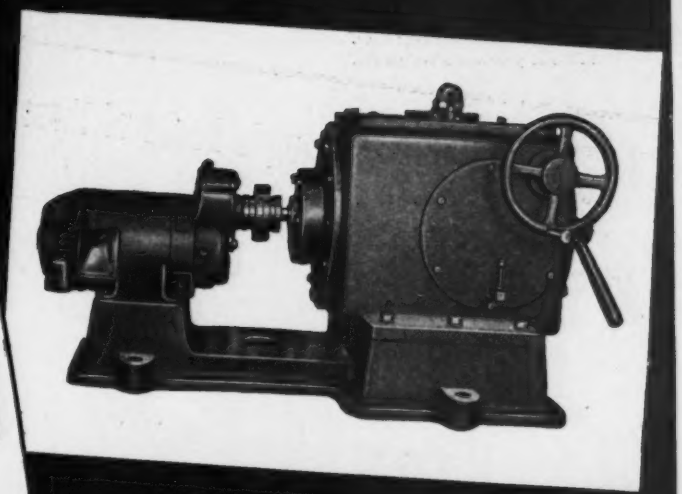
TITANOX

Reg. U. S. Pat. Off.

TITANIUM PIGMENT CORPORATION
SOLE SALES AGENT

111 Broadway, New York 6, N. Y.
104 So. Michigan Ave., Chicago 3, Ill.
350 Townsend St., San Francisco 7, Cal.
2472 Enterprise St., Los Angeles 21, Cal.

NOW... with Variable Speed Motor-Generator Set Drive



Sandy Hill BERTRAMS SHAKE

Here it is! The complete unit, a Sandy Hill improvement on the basic Bertrams design! The drive consists of an AC motor that drives a DC generator providing the required power. Sandy Hill, the only U. S. manufacturer licensed directly by Bertrams, Ltd. of Edinburgh, has access to all improvements developed by Bertrams.

Designed for FULL HARMONIC MOTION, the Sandy Hill Bertrams Shake has proven its worth in scores of paper mill installations. Completely flexible through a wide range of speeds and lengths of stroke. Minute adjustments *while machine is in operation* provide control of paper formation never before possible. No more shutting down of the shake for length of stroke adjustment.

THE SANDY HILL IRON & BRASS WORKS
HUDSON FALLS, N. Y.

*Advertising "know how"

Reinhold-Gould expertly supports mill brand papers with year 'round intelligent exploitation of trade journal space, direct mail and thorough-going sampling methods.

*A bonus with Reinhold-Gould distribution of your mill brand papers.

This advertisement is now appearing in PRINTING, PRINTING NEWS MODERN LITHOGRAPHY THE NATIONAL LITHOGRAPHER and PRINTERS' INK

Be sure to send for sample books of these Gould Papers

Exquisite! Practical! Pressworthy!

Kromekote

Unquestionably, champion KROMEKOTE is the ultimate in rich, lovely raiment for quality printing—black-and-white or process; line or halftone. The distinctive white background and brilliant high finish combine to enhance the beauty of the most elaborate or the very simplest printing job. Add the pressworthiness factor, as attested by leading printers across the country, and you know why KROMEKOTE is unexcelled in coated papers.

Modernize your paper reference files today...
Send for samples and specimens of "KROMEKOTE"

- Label
- Litho
- Cover
- Postcard

Available in label weight; litho coated-one-side; 6-pt. cover coated-one-side and 10-pt. postcard coated-two-sides.

KROMEKOTE—Patented beauty by CHAMPION

Crystallon

mother-of-pearl COVER

Old friend in sprightly modern dress, CRYSTALLON is improved in every respect.

5 ORIGINAL COLORS AND WHITE

1 PRACTICAL WEIGHT—7 pt.

2 SIZES—20x26, 23x35

Step-up the interest of your special events-printing. CRYSTALLON provides attractive setting for your craftsmanship.

CRYSTALLON—A RIEGEL achievement

TWINTONE new idea in TEXT and COVER

Deep, decorative colors in cover weights contrast with unusual pastel tints of text weights to give beautiful, felt finished TWINTONE the new look smart printing designers are using with effectiveness.

TEXT—26x40—160M
7 pastel tints and white
COVER—26x40—260M and 400M
7 deep shades and white

TWINTONE—Product of PENINSULAR PAPER CO.

Metalvein duplex cover

Strikingly new and novel leather-embossed cover paper for distinguished printing.

5 UNUSUAL COLORS AND WHITE

Aqua, Jade, Cobalt, Shell, also white, with metallic silver decoration; Beige with metallic gold decoration.

ONE SIZE—ONE WEIGHT
20 x 26—10 point

Easy-to-print, METALVEIN adds genuine appeal to anniversary books, direct mail, journals, menus, display cards and souvenir programs.

METALVEIN—by PLASTIC COATINGS CO.

REINHOLD-GOULD, INC.
535 Fifth Avenue, New York 17, N.Y.
Gentlemen: Please rush to me sample books of the following Gould Papers:
☐ Kromekote ☐ Metalvein Cover
☐ Crystallon Cover ☐ Twintone
Name .....
Firm .....
Address ..... Zone ..... State .....
City .....

mail this coupon today

Reinhold-Gould, INC.

535 FIFTH AVENUE, NEW YORK 17 • VANDERBILT 6-2100 • Uptown Branch: 261 Walton Avenue

Gaylord Bags

The Quality that Keeps Customers Friendly

The extra strength, uniform size and full weight of Gaylord Kraft Bags and Sacks are liked by retailers and consumers.
Top quality wins and holds friends—always.

- Kraft Grocery Bags and Sacks
- Kraft Paper and Specialties
- Corrugated and Solid Fibre Boxes
- Folding Cartons

139

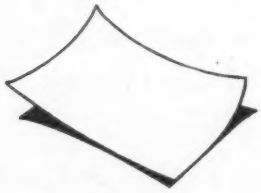
GAYLORD CONTAINER CORPORATION, General Offices: SAINT LOUIS

History in the Making

History can be measured in terms of years or in terms of accomplishment. The Chillicothe Paper Company is proud to be a part of an industry which can measure its history both ways.

Frankly, we're not the oldest paper company in the country, nor are we the largest. While we have the deepest respect for our elders, we earnestly believe we have earned *their* respect through our accomplishments since 1920.

Tradition is a wonderful thing in any business. But at Chillicothe we believe it is something to build from—not to. That's why Chillicothe history will always be "in the making."



"Chillicothe Papers—make the best impression"

THE CHILLICOTHE PAPER CO.

CHILLICOTHE, OHIO

THOMAS *Flexible* COUPLINGS

ALL METAL

SPECIFIED WHERE 100% DEPENDABILITY IS DEMANDED

TODAY'S MODERN HIGH-SPEED PAPER MACHINERY REQUIRES COUPLINGS WITH ALL THE IMPORTANT FEATURES BUILT INTO COUPLINGS DESIGNED BY THOMAS

HIGH SPEED TYPE

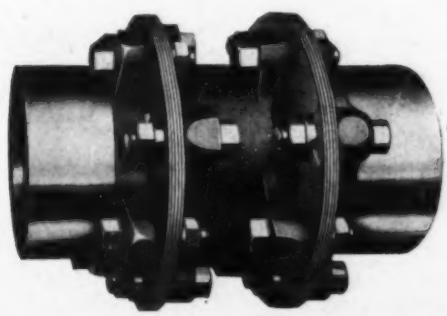
Engineered to stand up on the toughest jobs, Thomas *All Metal* Flexible Couplings do not depend on springs, gears, rubber or grids to drive. All power is transmitted by direct pull.

BACKLASH FRICTION WEAR and CROSS-PULL are eliminated

●

No Lubrication is required!

The longer life of Thomas Flexible Couplings, without interruptions and replacements will cut operating costs on wood choppers, centrifugal pumps and all heavy duty transmission machinery in the paper industry!



LOW AND MEDIUM SPEED TYPE

THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT

Write for the New Engineering Catalog.

THOMAS FLEXIBLE COUPLING COMPANY

WARREN, PENNSYLVANIA

Makers of Fine

Carbon Blacks

for the

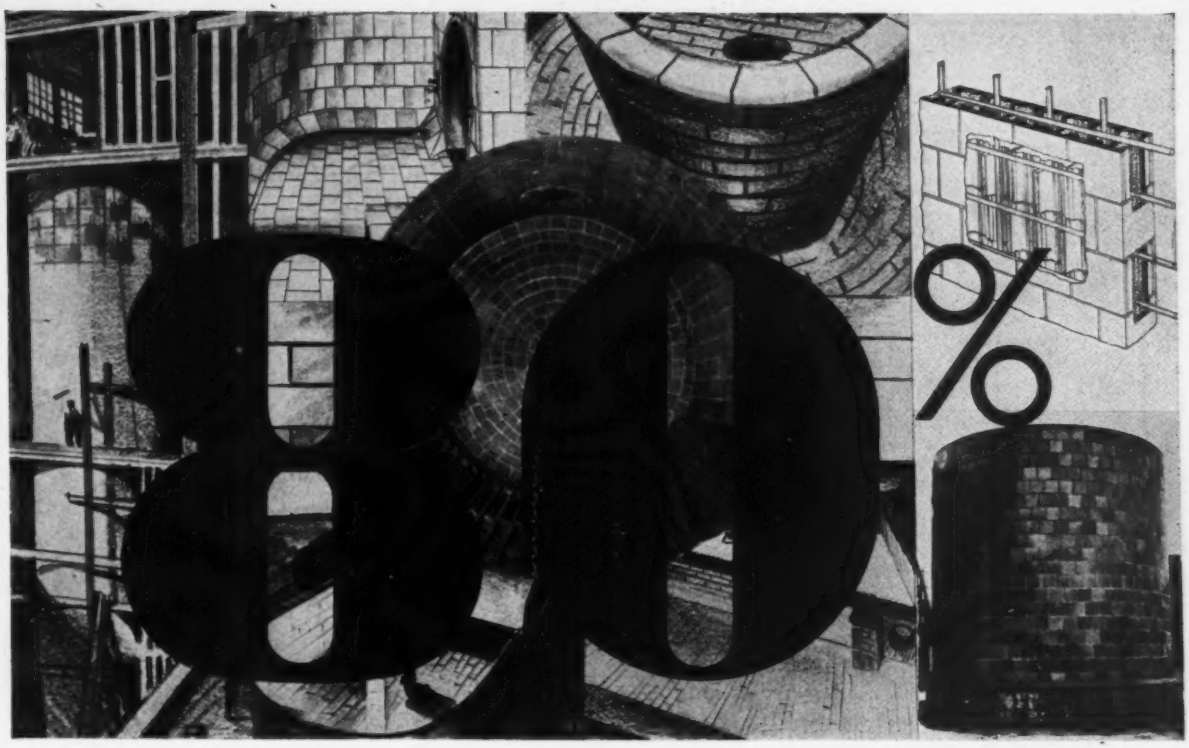
Paper Industry

UNITED CARBON COMPANY, INC.

Charleston 27, West Virginia

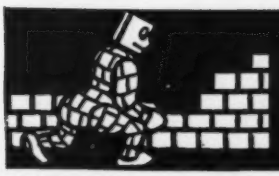
New York • Akron • Chicago • Boston

In Canada: Canadian Industries, Ltd.



OF ALL CHEMICAL PULP MADE ON THIS CONTINENT IS PROCESSED AT SOME STAGE OF ITS MANUFACTURE IN EQUIPMENT BUILT OR LINED BY STEBBINS.

Let us demonstrate the superiority of Stebbins lining and tile tank service the next time you line a new vessel or reline an old one.



SEMCO

Stebbins Engineering and Manufacturing Company

EASTERN BOULEVARD, WATERTOWN, NEW YORK

75th to 99th ANNIVERSARY

FOUNDED in 1849, the L. L. Brown Paper Company, Adams, Mass., has specialized in making the highest grade record and business correspondence papers for 99 years. Throughout that period its products have been the accepted standard of quality and value in their respective fields.

COTTON and LINEN CONTENT

LEDGERS

LINENS

BONDS

INDEX BRISTOLS

AND HIGH-GRADE SPECIALTIES

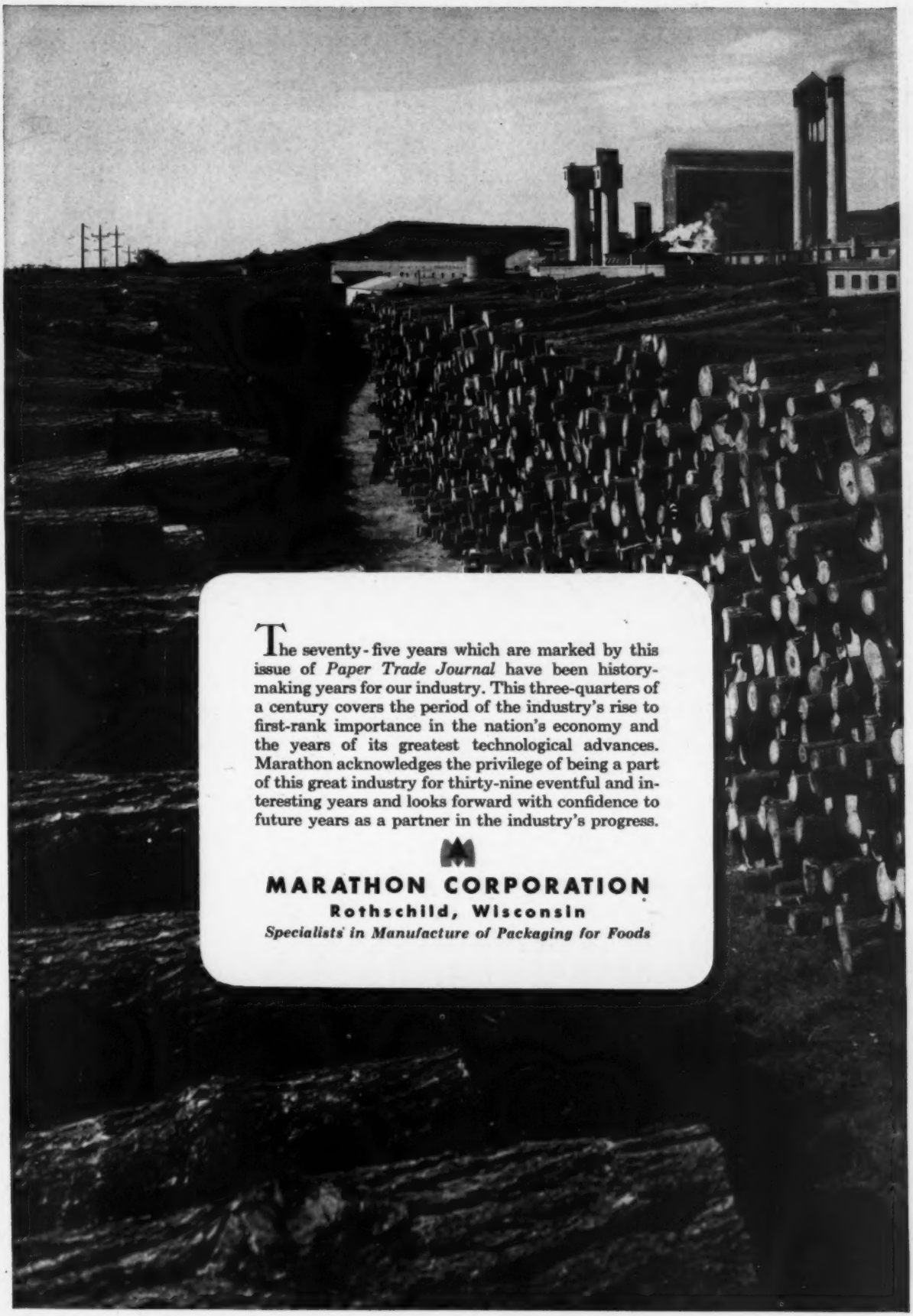
L. L. BROWN

Quality-Value PAPERS

Despite outstanding quality, L. L. BROWN papers add only negligibly (if at all) to total accounting and correspondence costs.

ADAMS, MASS.

Since 1849



The seventy-five years which are marked by this issue of *Paper Trade Journal* have been history-making years for our industry. This three-quarters of a century covers the period of the industry's rise to first-rank importance in the nation's economy and the years of its greatest technological advances. Marathon acknowledges the privilege of being a part of this great industry for thirty-nine eventful and interesting years and looks forward with confidence to future years as a partner in the industry's progress.

MARATHON CORPORATION

Rothschild, Wisconsin

Specialists in Manufacture of Packaging for Foods

MOSINEE

"More than Paper"

congratulates

The Paper Trade Journal

for its

75 years of service

to the

American Pulp & Paper Industry

MOSINEE PAPER MILLS COMPANY • MOSINEE, WIS.

"Essential Paper Manufacturers"

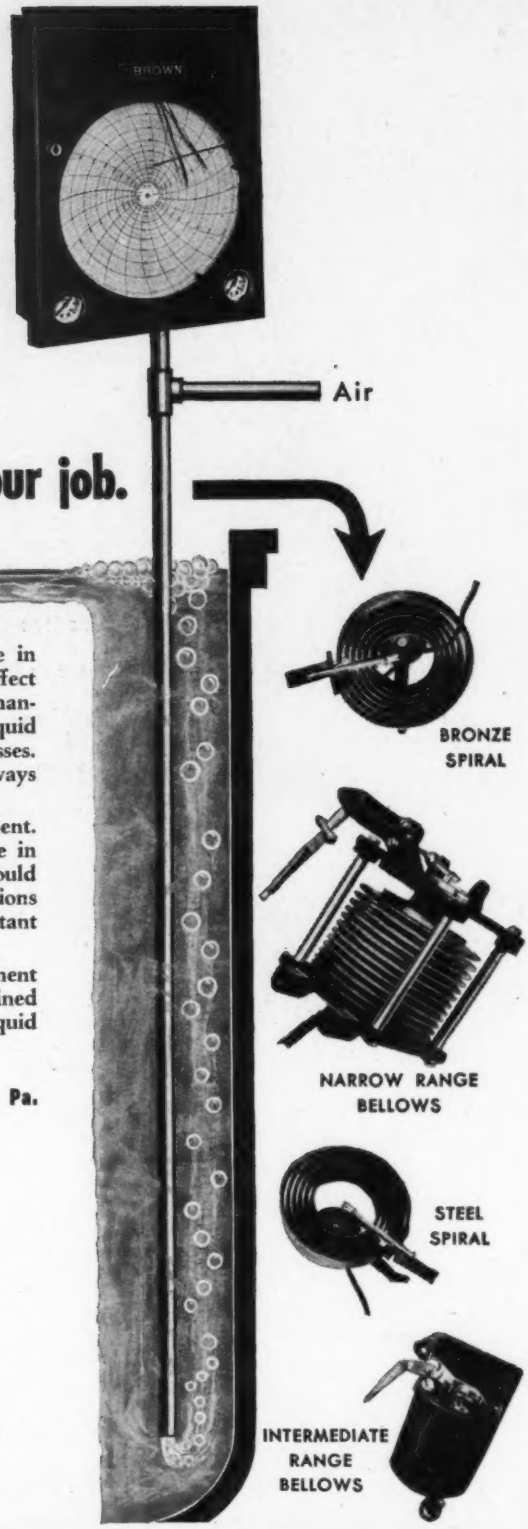
FOR an eventful three-quarters of a century you have kept faith with a great American industry. Your reportings and factual presentations down through the years have demonstrated an understanding of the needs of the men who make and sell paper. And for your work you have won the immeasurable praise and good will of these men whose livelihood and success depend on being well informed on progress in the industry.

We know how much this anniversary means to you because, incidentally, it is our 75th birthday too! Our best wishes to you, Paper Trade Journal!

KIMBERLY-CLARK CORPORATION
NEENAH, WISCONSIN

LEVEL CONTROL

With just the right element for your job.



LIQUID LEVEL control assumes extraordinary importance in the Paper Industry. The liquid level controller has a direct effect on chemical concentrations in many processes, and on the mechanical operation of others. From an over-all viewpint, *precise* liquid level control is vital in maintaining equilibrium of plant processes. Precise control eliminates those upsetting variations that are always dogging production.

The basis for precise control is accurate, sensitive measurement. That is why the whole array of measuring elements available in Brown Liquid Level Controllers is so important. One element could be adjusted to measure a wide range of liquid level applications but not without sacrificing the power and sensitivity so important for good control.

In Brown Liquid Level Controllers, the exact measuring element is available to suit your job. This measurement accuracy combined with the well-known Brown *Air-o-Line* control unit produces liquid level control of unequalled performance.

The Brown Instrument Co., 4510 Wayne Ave., Philadelphia 44, Pa.
DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR CO.
Offices in principal cities of the United States, Canada and throughout the world

INSTRUMENTATION for the PAPER INDUSTRY

This free 80-page book is a virtual handbook covering the instrumentation of all important paper mill processes. It contains 28 schematic drawings as well as page after page of informative data. Write for Bulletin 2801.

BROWN *Advanced Instrumentation* **FOR BETTER PROCESSING**
Product of MINNEAPOLIS **Honeywell**

TWO ROLLS

from the World's Largest Specialty Roll Shop

Here are two examples that illustrate the broad diversity of requirements met constantly in the Farrel roll shop.

One is a reverse coating roll which is ground round and straight to within *one-half of one ten-thousandth inch.*

The other is a bottom roll of a paper calender stack, 25 feet in face length, with a perfectly graduated increase in diameter from ends to center of *sixty thousandths of an inch.*

When you need a roll for any application, consult Farrel. For nearly a century we have been designing and manufacturing rolls to meet specific needs exactly. FB-433

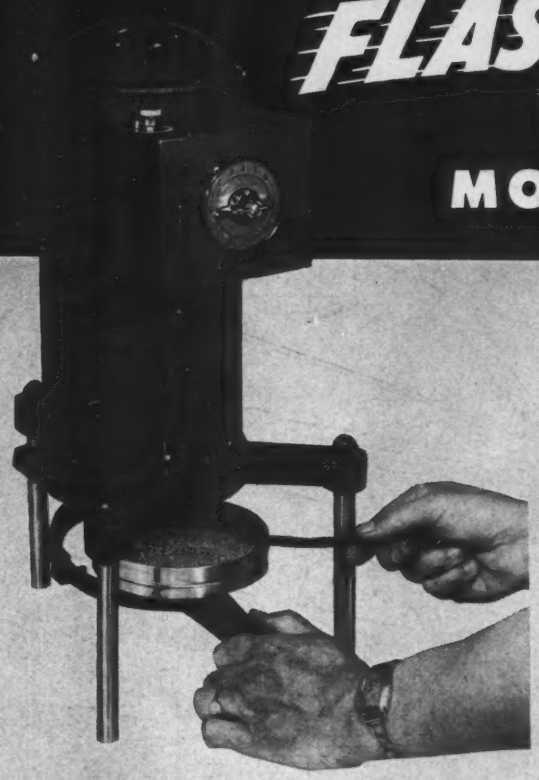
FARREL PAPER MILL MACHINERY

ROLLS: Chilled Iron, Dry Sand, Meehanite, Alloy Iron, Steel, Chromium Plated
FOR: Calender Stacks • Board Calenders Super Calenders • Glassine Callenders Friction Rolls • Breaker Rolls • Smoothing Rolls • Coating Rolls • Creping Rolls • Plater Rolls • Cutting Rolls Paraffining and Waxing Rolls • Saturating Rolls • Silicating Rolls • Miscellaneous Special Purposes
CALENDERS: Paper and Board
GRINDING MACHINES: Roll
CALIPERS: Roll
GEARS, CUT: Spur, Single and Double Helical (Farrel-Sykes Continuous Tooth Type)
SPEED REDUCING GEAR UNITS
SPEED INCREASING GEAR UNITS
FLEXIBLE COUPLINGS

FARREL-BIRMINGHAM COMPANY, INC., ANSONIA, CONN.
Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Boston, Pittsburgh, Akron, Chicago, Los Angeles, Tulsa, Houston

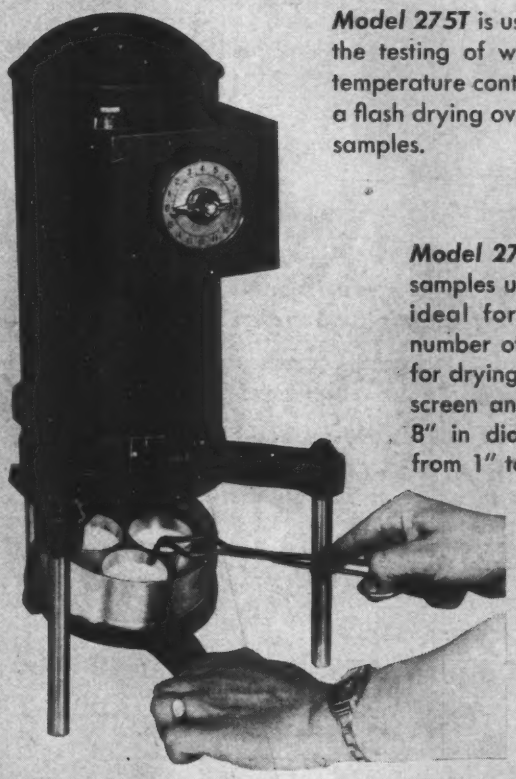
Farrel-Birmingham

FLASH-DRY SAMPLES TO DETERMINE MOISTURE CONTENT



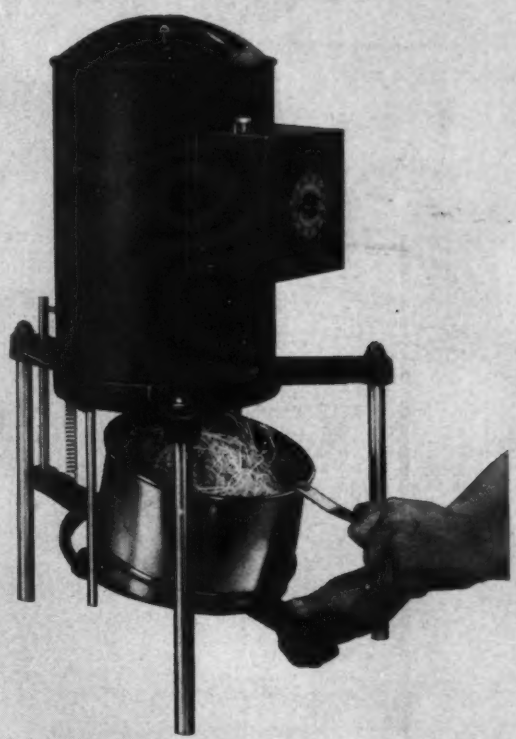
A complete line of Dietert-Detroit Moisture Tellers is available for the rapid, accurate moisture determination of such substances as chemicals, foods, fabrics, grains, sands, fuels, clays, semiliquids and others.

Model 275 is designed for materials not sensitive to drying temperatures. It has a drying pan 5" in diameter holding up to 100 gram samples.



Model 275T is used for all substances, the testing of which requires precise temperature control. It may be used as a flash drying oven for liquids or small samples.

Model 278T is used for bulky samples up to 500 grams. It is ideal for handling a large number of liquid samples and for drying materials in the wet screen analysis. The pans are 8" in diameter and may be from 1" to 4" in depth.



Write for descriptive folder and prices.

2897

HARRY W. DIETERT CO.

9330 ROSELAWN AVE., DETROIT 4, MICHIGAN

SAND • MOLD • MOISTURE • SULFUR • CARBON

RUST SERVICE

Experience developed in twenty-five years
service to
The Pulp and Paper Industry
is offered in
Engineering and Construction
of
all production facilities
and
complete mills

THE RUST ENGINEERING COMPANY

Pittsburgh, Penn.

FEDERAL 1776

FEDERAL PAPER BOARD COMPANY, Inc.

Inland Paper Board Division

Acme Paper Board Division

Liberty Paper Board Company, Inc.

for

SERVICE and QUALITY

of

Folding Box Boards

Specialty Boards

.009 Corrugating Medium

Jute Liner

BOGOTA **NEW JERSEY**

HAWTHORNE

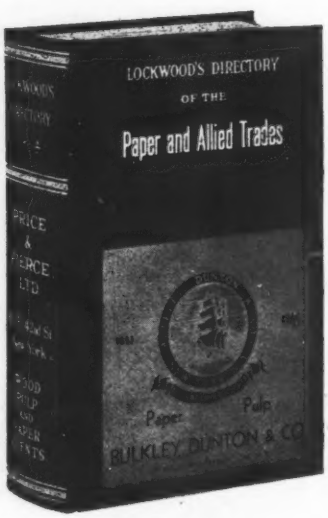
PAPER COMPANY

KALAMAZOO - MICHIGAN

•

Writing, Record, Fine Printing and Specialty Papers

Made from
Cotton and Wood
fibres



ORDER YOUR COPY NOW

$10 per copy

Lockwood Trade Journal Co., Inc.,
15 W. 47th St., New York 19, N. Y.

Kennedy Solves Packaging Problems

WHATEVER YOUR PACKAGING PROBLEM— you can depend on Kennedy to solve it. Kennedy fabricates packaging from all types of protective materials:

Waterproof Paper • Kraft Paper • Pliofilm
Saran • Vinyls • Metal Foil • Cellophane

KENNEDY PACKAGING PROVIDES POSITIVE PROTECTION against dirt • dust • moisture • vapor • rust • corrosion • mold.

STANDARD KENNEDY PRODUCTS

Car Liners • Box Liners • Barrel Liners • Moisture Barriers • Auto Storage Covers • Furniture Covers • Garment Storage Bags • And many others.

KENNEDY CAR LINER & BAG CO., SHELBYVILLE, IND.
Canadian Plant • Woodstock, Ontario

Kennedy

FABRICATORS IN WATERPROOF PAPER · KRAFT PAPER
PLIOFILM · SARAN · VINYLS · METAL FOIL · CELLOPHANES

STADLER, HURTER & COMPANY

SUITE 609, DRUMMOND BUILDING
MONTREAL, CANADA

CONSULTING ENGINEERS

Specializing since 1923 in

PULP AND PAPER MILLS

FROM

FOREST TO FINISHED PRODUCT

A. T. HURTER
M. E. I. C.

THE ALBEMARLE PAPER MANUFACTURING COMPANY

Richmond, Virginia

BLOTTING

COVER

KRAFT

ALBEMARLE
Pioneer Advertising

Sales Offices: 280 Broadway
New York, N. Y.

Chicago Daily News Bldg.
400 W. Madison St.
Chicago, Ill.

VALLEY PAPER COMPANY

HOLYOKE • MASSACHUSETTS

Manufacturers of

RAG CONTENT BONDS

LEDGERS
ONION SKINS

SPECIALTIES

Established 1866

WILLIAMS SMOOTHNESS AND FORMATION TESTER

For The Rapid And Accurate Measure Of Finish Formation And Printability Of Paper

Automatic timing with electric stop clock
No technical skill required

For 25 years we have developed and manufactured Pulp and Paper Testing Equipment

Pulp Testing Ovens
Sheet Moulds
Laboratory Presses
Sheet Dryers
Wood Chip Classifiers
Pebble Mills
A.S.T.M. Penetration Testers
Electric Centrifuges
Paper Moisture Testers
Freeness Testers
Laminating and Plastic Moulding Presses

WILLIAMS APPARATUS CO., Inc.
19 PARK PLACE — WATERTOWN, N. Y.

DANDY ROLLS
FOR
PAPER MACHINES

WATERMARKING

TRUNNION ROLLS AND STANDS

TABLE ROLLS
DANDY TYPE
OPEN CONSTRUCTION
FOR FAST RUNNING MACHINES

We Cover, Repair and Replace Worn Out Rolls

JOS. J. PLANK & CO.
APPLETON, WIS.

LEADING PAPER MILLS Use Papermakers'

D-I-LESTOIL
(In cooking, washing or pulping)

for...

1. DE-INKING — newsprint, magazine and ledger papers.
2. DE-WAXING — cotton linters — waxed papers.
3. DE-GREASING — rope stock — cotton mill sweeps.
4. REMOVAL of — Asphalt — Pitch — Adhesives — Sizing and other troublesome soil from all raw stock.
5. DEFIBERING — because of its excellent wetting, emulsifying and dispersing action.
6. KEEPING SYSTEMS CLEAN — Felts — Wires — Washers kept clean and costly shutdowns avoided.

CLEAN RAW STOCK MEANS BETTER PAPER

Prove it in your own mill. Write today for FREE working sample of this unequalled cleansing and wetting agent.

Dept. P-1

ADELL CHEMICAL CO.
HOLYOKE, MASSACHUSETTS

COLUMBIA MILL DEVELOPMENT COMPANY, Ltd.

Holden Building — 16 E. Hastings Street — Vancouver, Canada

CONSULTING ENGINEERS

Actively assisting in the development of the Pacific Northwest Pulp and Paper Industry

★ Equipment design for:
Pulp and Paper Mills
Saw Mills
Power Plants

★ Designs and Plans
Specifications
Inspection
Reports

Congratulations

to the Paper Trade Journal

on their 75th Anniversary

LEE PAPER COMPANY

Vicksburg, Michigan

GILMAN PAPER COMPANY

Kraft Paper

Gummed Tape

Multi-wall Sacks

Newsprint

Mills at Gilman, Vt., Howland, Me., St. Marys, Ga.

Sales Offices: 630-5th Ave., New York 20

Manufacturers of Binders Board and Allied Products Since 1842

THE DAVEY COMPANY

164 Laidlaw Avenue **Jersey City 8, N. J.**

DISTRIBUTORS IN ALL PRINCIPAL CITIES

Mills at: Downingtown, Pa. Jersey City, N. J.

Canadian Representative:

The Brown Brothers, Ltd., Toronto, 2

The Best in Tanks for Paper Mills For more than Seventy Five Years.

THE HAUSER-STANDER TANK COMPANY

CINCINNATI, OHIO

GEAR YOUR ADVERTISING TO THE TREMENDOUS POWER OF PAPER TRADE JOURNAL AND ADD THESE GREAT ALL-TIME FEATURES:

PAPER TRADE JOURNAL is the *oldest* publication devoted to the pulp and paper industries.

PAPER TRADE JOURNAL has top recognition by the industry in all surveys made.

PAPER TRADE JOURNAL *leads* all other paper publications for subscription renewals—by percentage and by actual individual count.

PAPER TRADE JOURNAL has world wide recognition of editorial content which is abstracted in many publications outside the United States.

PAPER TRADE JOURNAL has the *highest subscription rate* of any paper publication and the greatest readership audience, *without* a circulation sales staff. without premiums, price cuts or inducements of any kind.

PAPER TRADE JOURNAL carries the *largest number of advertisers*—the greatest number of advertising pages of any publication purporting to cover the paper industry.

NOW is the Time to Start Selling the Pulp and Paper Industries by Advertising in

THE PAPER TRADE JOURNAL

15 West 47th Street, New York 19, N. Y.

Compliments

of

BELOIT BOX BOARD CO.

INCORPORATED

MFGRS. BUILDING PAPER AND BOX BOARDS

Beloit, Wisconsin

Willamette

SERVING

PAPER & PULP INDUSTRIES WITH COMPLETE MACHINE, PLATE AND SHEET METAL FACILITIES

- Digesters
- Accumulators
- Pressure Vessels
- Storage Tanks
- Stainless Vats
- Stainless Pipes & Fittings
- Plate & Structural Fabrication
- Conveyors
- Decker Cylinder Moulds
- Dryer Cylinders
- Grinders
- Huffman Hogs
- Barker Carriage
- Log Handling Equipment
- Yarders & Loaders

MANUFACTURED TO YOUR PLANS and SPECIFICATIONS

WILLAMETTE IRON & STEEL COMPANY

PORTLAND OREGON

THE GARDNER-RICHARDSON CO.

MIDDLETOWN, OHIO

MANUFACTURERS OF

COATED LITHWITE*

AND OTHER GRADES OF

FOLDING BOXBOARD—

FOLDING CARTONS

* T.M. REG.—U. S. PAT. OFFICE

WISCONSIN

Perfect Surface

FOURDRINIER WIRES—CYLINDER WIRES

Eastern Representative—
HARRY C. KINNE, THE M. E. AVERY CO.

Central States—FRANK J. HALLOIN

West Coast—THE DAN E. CHARLES AGENCY

Southern States—W. W. HENDERSON & SONS

WISCONSIN WIRE WORKS

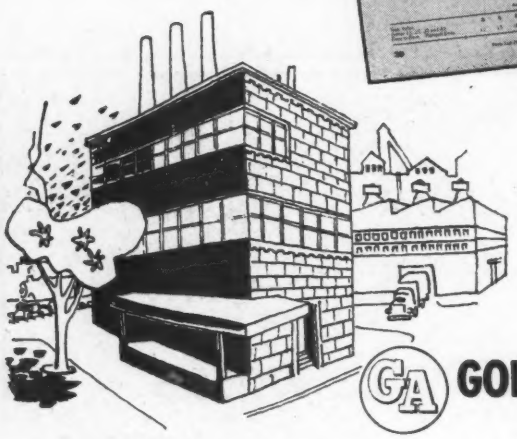
APPLETON - - - - WISCONSIN

Golden-Anderson

VALVES

over 1500 types and sizes for engineered protection

SINGLE ACTING STANDARD ALTITUDE VALVES
SINGLE ACTING NON-RETURN VALVES
WATER PRESSURE REDUCING VALVES
ACTING DIFFERENTIAL ALTITUDE VALVES



Since 1905

For more than 35 years Valves by Golden-Anderson have proven satisfactory in the protection of life and property. Engineer-designed to give safe, dependable control under even the most difficult and adverse conditions. For complete informative and technical data, send our engineering department your most difficult assignment.

GOLDEN-ANDERSON VALVE Specialty Company

Keenan Building · Pittsburgh 22, Pa.

DIRECTORY.

NEW YORK HOUSES.

PAPER AND PAPER-MAKERS' SUPPLIES.

BRAUTIGAM & WATSON, 61 Beekman St.

BULKLEY, DUNTON & CO., 74 John St.

GOODWIN, COBB & CO., 16 Reade St.

HARRIS BRO. & CO., 40 John St.

HEWITT, C. B. & BRO., 40 Beekman St.

HULBERT, H. C. & CO., 13 Beekman St.

MILLAR, G. W., 10 Spruce St.

MURPHY, JOHN J., 47 John and 5 Dutch Sts.

PERKINS & GOODWIN, 84 Duane St.

PLATNER, MILLER & CO., 32 Beekman St.

PLUMMER, H. & CO., 161 William St.

PORTER, JAMES F., 69 Duane St.

PREBLE, J. O. & CO., 77 White St.

PRIESTLY, JOHN & CO., 33 Beekman St.

VERNON BROS. & CO., 65 & 67 Duane St.

WILKINSON BROS. & CO., 73 Duane St.

STRAW WRAPPING PAPER.

CORNELL & CAVE, 171 Fulton St.

HEDGES & HORSE, 180 Fulton St.

TOMPKINS, D. D., Barclay St.

STRAW BOARDS.

HAYES, JAMES E., 77 Duane St.

MALLORY & BUTTERFIELD, 96 William St.

PAPER MAKERS.

BEEBE, IRA L. & CO., 77 Beekman St.

BRIGGS, E. S., 41 Barclay St.

HOAG, JOHN T., 37 Chatham St.

PHILP, H. A. & CO., 107 Reade St.

PAPER STOCK.

BRIGGS, R. B. & CO., 66 & 73 Centre St.

BUCKLEY, C. H., 127 Reade St.

FETT, HUGO & CO., 48 Broad St.

KELLEY, WILLIAM & SON, 44 Sheriff St.

KEENAN, OWEN & CO., 41 Duane St.

HILDEA, P., Christopher and West Sts.

SPAULDING, CHARLES F., 200 Water St.

STOCKWELL, JOHN C., 21 Ann St.

TAYLOR, E. W. & CO., 264 Water St.

MANUFACTURERS.

HANGING PAPER.

ALLEN BROS., Sandy Hill, N. Y.

BOOK AND NEWS PAPER.

BARON, WARREN & CO., Philadelphia, Pa.

BRADNER, SMITH & CO., Chicago, Ill.

CLAREMONT MANUF'G CO., Claremont, N. H.

CLEVELAND PAPER CO., Cleveland, O.

DAVIS & MOORE, Boston, Mass.

McILVAINE & CO., Petersburgh, Va.

ROCKLAND CO., Montville, Conn.

STEWART PAPER CO., Cincinnati, O.

MANILLA PAPER.

BILLINGHAM & CO., Boston, Mass.

DEXTER, C. H. & SONS, Windsor Locks, Conn.

HAMMER & FORBES, Burnside, Conn.

HOWLAND & MILLER, Sandy Hill, N. Y.

SHELDON, GEO. S. & CO., Mill River, Mass.

WILDER & CO., Boston, Mass.

WOODWORTH, OLIVER, New London, Conn.

STRAW NEWSPAPER.

MORRISON, BARE & CO., Roaring Springs, Pa.

STAR PAPER CO., Shortsville, N. Y.

MANILLA TISSUES.

ROBERTSON, GEORGE & SONS, Hinsdale, N. H.

ROBERTSON, JOHN, New London, Conn.

ON THE MANUFACTURE OF BLUE-TINTED PAPER.

BY DR. [illegible].

Translated expressly for the PAPER TRADE JOURNAL.

For the ordinary kinds of blue envelope paper, the color is obtained by means of a Ferrocyanide of Iron. Formerly, the dry color (Paris, Prussian or Mineral Blue), ground very fine with water, was placed in the engine. Later, the better process was adopted of making the color on the spot by mixing solutions of Copperas with Prussiate of Potash, as the fresh precipitated Prussian Blue can be more equally distributed in the engine. The following method, however, is better still: Six pounds of Copperas and five pounds of Prussiate of Potash are dissolved separately in sufficient water, and both solutions poured into the engine. In this way the coloring can incorporate itself in the most equal and thorough manner with the pulp. In order, however, to always produce the same shades and intensity of blue, several precautions must be taken, which are necessitated by the easy oxidizability of the Iron before and after the formation of the blue compound. Above all things the Copperas must not be exposed to the air for too long a time; before the addition of the two solutions the Chlorine must be expelled as much as possible from the half stuff,—and, lastly, the colored finished pulp must always be exposed to the same conditions of place, time and temperature before it is further manipulated. One day's rest, more or less, an atmosphere containing more or less of Chlorine may develop a much weaker or stronger color. It would, therefore, probably be safest to use, instead of a solution of a Salt of the Protoxide, one of a Salt of the Peroxide, made as neutral as possible.

CLAY IN PAPER.

We suppose our publishing friends at home and abroad will pardon us for subjecting their journals to the action of fire and acids, as we do not throw into the crucible the learned opinions, essays and statements which they contain. Having been employed by a paper dealer to make chemical examination of two specimens of paper which were offered at the same price, results were reached which were somewhat surprising. One specimen gave only 0·60 per cent. of ash, while the other gave 9·61, and both in appearance were equally good. The ash of the first specimen was almost wholly composed of silica, tinged with a little oxide of iron, while the second was made up largely of *kaolin*, an aluminous earth, very fine and white. With each one hundred pounds of this paper there was incorporated 9½ pounds of the clay, which cost the manufacturer about one cent a pound. If pure paper costs the manufacturer 10 cents a pound, the adulterated could be made at about 9 cents, which affords a fine margin for profit. The results of this investigation led us to examine the paper used by various publishers whose journals come to us by way of exchange. We present below the names of some of these journals, and, in connection, give the ash determination of each. The percentage of ash is given as found after drying the paper at a temperature of 100° C.

Scientific American, New York		14·00
Artisan, Athens, Ga.		18·62
Independent, New York		8·71
Telegraphier	"	9·09
Nation	"	6·21
Tribune	"	3·23
Herald	"	3·06
Post,	Boston	4·50
Advertiser	"	2·68
Herald	"	·66
Boston Journal of Chemistry		·46
FOREIGN JOURNALS.		
Science Gossip, London		21·32
Chemical News	"	17·88
Academy	"	17·20
Land and Water	"	17·25
English Mechanic	"	15·32

From these determinations it will be seen that some of our journals are indeed "of the earth earthy." Among those examined from this country, our esteemed neighbors of the *Scientific American* send out weekly the heaviest freight of *terra alba*. Their paper maker gives them fourteen pounds of clay in each one hundred pounds of the paper; and if it is probable they use 3,000 pounds weekly, he sends them for distribution something over *eleven tons* annually. We are disposed to claim that our transatlantic cousins fail to excel us in most industrial processes, but it must be conceded that the paper makers across the "big ferry" are more expert than ours in fabricating paper from clay. That useful and entertaining journal *Science Gossip* gives in its *paper rather more than one ton of earth in every five*, and the others in the list follow close in the amount distributed. The use of clay in paper may or may not be fraudulent; it depends upon the conditions under which it is sold. The papers containing large quantities of clay are apparently good, and probably satisfactory to publishers and patrons. If so, there is no fraud committed in using clay, provided the purchaser understands it, and the price corresponds with the price of the cheap material used in manufacture. We wish good paper could be made *entirely* of clay; we could then double the size of the *Journal* without increasing the expense of publication. Our paper maker, it will be seen, by referring to the list, ignores the use of it altogether, the amount of ash being less than half of one per cent. There is a heavy crisp quality observable in the English journals which is somewhat disagreeable and inconvenient. It is probable that considerable tough vegetable fibre and peculiar sizing is necessary in paper which contains much clay. If journalists knew something of the materials used in fabricating their paper, they will be better able to fix upon just prices for the material, and hence the investigations here presented may be of some service to the craft.—*Journal of Chemistry.*

CARBOLIC PAPER.

As a simple method of employing carbolic acid, C. Hombourgh, of Berlin, proposes to saturate sheets of coarse millboard with the disinfectant in question. The sheets may be hung up in the rooms requiring purification, or a small piece may be torn off when a small quantity of carbolic acid is wanted. Sheets of millboard, having an area of about seven square feet, and containing about one-fifth of a pound of carbolic acid, are sold in Berlin for a shilling apiece.—*Scientific American.*

[The above is an American invention, covered by a patent issued five or six years ago to Eames and Seely.—ED.]

PAPER PATENTS

ISSUED SINCE JANUARY 1st, 1872.

[illegible]

PAPER STOCK.

[illegible].—Manufacture of Paper.—[illegible], Marysville, Cal.

[illegible].—Machinery for Treating Fibrous Plants.—[illegible], assignors to American Fibre Company.

[illegible].—Process for Obtaining Vegetable Fibres.—WILLIAM ADAMSON, Philadelphia, Pa.

[illegible].—Process of Treating Sugar Cane Leaves, &c., for Obtaining Fibrous Materials.—[illegible], Louisiana.

[illegible].—Machine for Treating Fibrous Plants.—WILLIAM B. [illegible], Boston, Mass.

PAPER STOCK.

[illegible].—Apparatus for Treating Paper Stock.—[illegible]; reissued February 27, 1872.

STRAW-CUTTING MACHINES.

[illegible].—Straw Cutters.—[illegible], February 20, 1872.

[illegible].—Combined Corn-Sheller and Straw-Cutter.—JEREMIAH P. [illegible], Pa.

[illegible].—Straw Cutter.—[illegible], N. Y.

[illegible].—Straw Cutter.—THOMAS E. [illegible], Va.

MANUFACTURE OF WOOD-PULP.

[illegible].—Apparatus for Manufacture of Paper Pulp from Wood.—JAMES [illegible], Me.

[illegible].—Machine for the Manufacture of Wood Pulp.—[illegible], N. Y., assignor to NEW YORK WOOD-PULP COMPANY, New York City.

[illegible].—Machine for Grinding Wood Pulp for Paper, &c.—[illegible], Mass.

[illegible].—Manufacture of Paper-Pulp.—[illegible], Germany.

[illegible].—Manufacture of Paper.—[illegible], New York, N. Y.

[illegible].—Manufacture of Paper-Pulp.—[illegible].

[illegible].—Manufacture of Paper Pulp.—[illegible].

[illegible].—Machine for Grinding Wood Pulp for Paper, &c.—[illegible].

PAPER-MAKING MACHINERY.

[illegible].—Paper Cutting Machine.—[illegible], Philadelphia, Pa., New York City.

[illegible].—Paper Making Machinery.—THOMAS [illegible], N. J.

[illegible].—Paper Bag Machine.—[illegible], Harrisburg, Pa.

[illegible].—Paper Feeding Machine.—[illegible], New York, N. Y.

[illegible].—Machine for Drying Paper, Wadding, &c.—[illegible].

[illegible].—Apparatus for Stamping Paper.—[illegible].

[illegible].—Paper Cutting Machine.—CHARLES W. L. [illegible], Brooklyn, N. Y.

[illegible].—Apparatus for Releasing and Regulating the Dandy Rolls of Paper Machines.—[illegible], Louisville, Ky.

[illegible].—Paper Trimming Machine.—WILLIAM G. AYERS [illegible], Brooklyn, N. Y.

[illegible].—Paper Cutting Machine.—[illegible], Brooklyn, N. Y.

[illegible].—Paper Cutting Machine.—BENJAMIN WEAVER, Springfield, Mass.

[illegible].—Paper Cutting Machine.—[illegible], Chicago, Ill.

[illegible].—Combined Cloth, Cord and Paper Cutter.—[illegible], N. Y.

[illegible].—Paper Making Machine.—[illegible], N. J.

[illegible].—Paper Calendering Roll.—[illegible].

[illegible].—Machine for Calendering Paper.—[illegible], Conn.

[illegible].—Paper Trimming Machine.—[illegible], North Britain.

[illegible].—Apparatus for Stamping and Punching Out Paper.—[illegible], Albany, N. Y.; antedated March 29, 1872.

BLEACHING AND COLORING.

[illegible].—Figure Tinted Paper.—[illegible], New York, N. Y.

[illegible].—Paper Sack Bench.—[illegible], N. Y.

[illegible].—Process for Bleaching Paper Pulp.—JOHN CAMPBELL, Chatham Village, N. Y.

ENGLISH PATENTS FOR APRIL.

[illegible].—Strainer Plates for the Manufacture of Paper.—H. WATSON, Newcastle-on-Tyne.

PATENTS.

[illegible].—Improvements in the Manufacture of Paper Pulp or Half Stuff.—T. LOWE, [illegible].

[illegible].—Improvements in Paper-Bag Engines.—W. R. LAKE, Southampton Buildings, London.

[illegible].—Improvements in Apparatus employed in Converting Esparto, Straw, Wood, and other similar substances into Pulp.—C. [illegible].

[illegible].—Improvements in Apparatus for the Cutting of Paper.—[illegible].

[illegible].—Improvements in the Manufacture of Pulp from Vegetable Fibres for Making Paper and other materials.—W. R. LAKE, Southampton Buildings, London.

MEETING OF PHILADELPHIA BOOK TRADE.

On Monday, May 20th, a meeting of the Philadelphia Book Trade Association, was held at No. 617 Jayne street, to take action upon the proposed reduction by Congress of the duties on books, paper, type, etc.

Mr. Thomas Macheller was called to the chair, and Mr. A. G. Elliot selected as Secretary.

Mr. S. J. Megargee moved that a committee of three be appointed to draft a memorial to Congress upon the subject.

Mr. Moore said that in his opinion a great deal more should be done than simply to appoint a committee. He thought that each special trade interested should appoint its own committees and send memorials to both houses of Congress, in protest against the proposed reduction. So far as the paper trade was concerned, if the reduction was made it would prove absolutely destructive. We cannot, as things now are in this country, at all compete with the foreign cheap labor unless we are protected. We should boldly demand our rights, not beg of Congress to do us justice, and therefore I say that every trade interested should organize and draw up its strong protest to Congress.

The President announced as the committee called for in Mr. Megargee's motion the following gentlemen: Messrs. S. J. Megargee, E. S. Cope and T. H. Moore.

Mr. Megargee said that there was no time to take such action of the separate trades interested as Mr. Moore suggested.

Mr. Cope said that there was no time to take the action, because even if the House passed the measure the Senate would have to act, and the trades could organize before the Senate could possibly do so.

Mr. Menamin, of the Typographical Union, in a few words asserted the necessity of the co-operation of the union with the book trade, in its action against the proposed legislation.

Mr. Turner, President of Typographical Union No. 2, addressed the meeting, and read a series of resolutions passed by the Union protesting against the proposed reduction of the duty.

Upon motion, the motion calling for the committee of three was reconsidered, and it was voted down.

The Chairman said that the attack began in Congress with the type-founders. But the type-founders, by their prompt action, prevented any such disastrous legislation as was at first proposed. With the House Committee of Ways and Means little can be done. Our hope depends upon the Senate Finance Committee.

Mr. Megargee then moved that a committee of three, or more, be appointed from each branch of the trade to take action and petition Congress against any change of the present tariff.

The Chair called upon the various branches of the trade present to name their committees, when the following were named:

Book Trade—Henry C. Baird, Alfred Martien, George Remsen.

Paper Makers—Messrs. Moore, Megargee, Cope and Burgh.

Bookbinders—Messrs. Tolmage, Rutter and Moore.

Printers' Union—William Turner, F. P. Farrell, H. J. Durborrow, R. S. Menamin, John Dunn, James Montgomery, J. W. Croft and James Beatty.

Typefounders—Messrs. Collins, Pagne and Macheller.

Printing Ink Manufacturers—Charles E. Johnson and Frank Woodruff.

Printers—Messrs. Sherman, Ferguson and McLaughlin.

Subscription Books—Messrs. Curdy, Stoddard, Evans and Jones.

After an announcement from the Chair that the foregoing committees would meet at a joint committee to-morrow morning at the same place, the meeting adjourned.

THE LATEST NEWS—THE TARIFF.

WASHINGTON, May 23, 1872.

The Tariff and Tax Bill has been reported to the Senate. The Committee on Finance propose that the act shall take effect on the 1st of July next, instead of January, 1873.

The committee place all paper and manufactures of paper, including books and other printed matter not especially provided for, under the ten per cent. reduction, striking out what the House provides on the subject. They include in the same section earthenware, glass and glassware, and wrought pipe, clay, kaolin and fuller's earth.

The committee place the duty on Soda Ash at three dollars per ton.

THE FREE LIST.

The House free list is stricken out and a new free list inserted, containing the principal elements of both House and Senate free lists, and adding thereto the book paragraph of the House. The free lists are altered so as to admit free of duty books in the English language which shall have been printed and manufactured more than twenty years at the date of importation; books and maps for the Congressional Library; books, maps and charts especially imported for literary societies and institutions of art and learning, not more than two copies each in one invoice; professional books of immigrants; books, household effects or libraries in use of families or persons from foreign countries, if used abroad by them not less than one year, if intended for private use.

The revised free list also includes all bale ropes, paper stock, crude of every description, including all grasses, fibres, rags, other than wool, waste shavings, clippings, old paper, rope ends, waste rope, waste bagging, gunny bags and gunny cloths, old or refuse, to be used in making and fit only to be converted into paper, and cuts for any other manufacture, and cotton waste, whether for paper stock or other purposes.

On Monday the Senate will take up the bill, and it is expected that no other business will be allowed to come up till that is finished. The House will then have to pass upon the Senate amendments, and then the bill goes to the President for his signature.

PAPER-STOCK HOUSE BURNED.

Messrs. Sanwood, Tower & Co.'s paper-stock house, situated at Gardner, Me., on the Cobbosseecontee River, was destroyed by the May Stat. The loss is $4,000; insured $2,000.

The firm have 13 engines and employ 35 hands. They turn out three tons of paper per day.

SITUATIONS WANTED.

We propose to print in this column advertisements of employers, such as machine tenders, engineers, &c., at the low rate of one dollar for a single insertion. We make this rate deviation from our regular prices in order to enable this class of operatives to advertise their wants frequently.

A Russian printer has invented a type-setting machine, which sets in an hour thirty thousand letters.

IMPORTATIONS OF PAPER STOCK, PAPER, CHEMICALS, &c.,

AT THE PORT OF NEW YORK, FOR THE WEEK ENDING MAY 23, 1872.

Alum.

Gilford, Sherman & Ives, Indiana, Liverpool ... 80 cks.
Bockmayel & Co., [illegible], London ... 100 cks.
Barclay & Livingston, Marlborough, Liverpool ... 100 bbls.
Walker, Sons & [illegible] ... 70 do
" " Indiana, ... 100 do
Barclay & Livingston, " ... 200 do
[illegible] & Watson, [illegible], Newcastle ... 50 do
" " [illegible] ... 60 cks.

Bleach Powders.

Wing & Evans, Indiana, Liverpool ... 80 cks
[illegible] & Watson, Geringe, Liverpool ... 160 do
Sherman & Nelson, J. Young, " ... 150 do
Cummings & Lockwood, Republic, " ... 75 do
Wing & Evans, Glasgow, " ... 20 do
W. Cunningham & Son " ... 100 do
A. Bailey & Son " ... 21 do
[illegible] & Watson, Cymene " ... 75 do
" June Young, " ... 25 do
C. P. Sumner, E. Augusta, " ... 50 do
C. Pfizer & Co., Calliope, " ... 50 do
Wing & Evans, Marlborough, " ... 60 do
" Calliope, " ... 100 do
J. L. & D. S. Riker, Emily Augusta, " ... 75 do
Smith & Co., " ... 50 do
" " ... 50 do
Wing & Evans, Bolivian, Newcastle ... 100 do
J. L. Thompson Son & Co., Calliope, Liverpool ... 75 do
Wing & Evans, W. [illegible], Dublin ... 50 do

Borax.

T. W. Christie, [illegible], Hamburg ... 1 cs.
[illegible] Bros., Pertina, Havre ... 3 cs.

Paper Hangings.

Fisher & Keller, Nemesis, Bremen, 1 case Paper Hangings.
" " Pereire, Havre, 1 " "

Rags & Paper Stock.

Goodwin, Cobb & Co., E. Augusta, Liverpool, 139 bales Bagging, etc.
Jessup & Moore, [illegible], Trieste, 53 bales Rags.
Buckley, Dunton & Co., Washington, Liverpool, 60 bales Bags, etc.
C. H. Buckley, Alexandria, Glasgow, 14 bales Paper Stock.
Buckley, Dunton & Co., London, 103 bales Waste Paper.
W. H. Parsons & Bro., Bergen, Liverpool, 213 bales Waste Paper.
W. H. Parsons & Bro., [illegible], Liverpool, 130 bales Rags.
W. E. Whitton, M. A. Pitt, Bermuda, 30 bales Rags.
W. T. Merritt & Bro. [illegible], 3 bales Rags.
Bush & Jessup, Castle, Calcutta, 940 bales Jute Butts.
G. G. Ramsay, " " 100 bales Jute Cuttings.
Smith & Co., Ann & Alice, Genoa, 105 bales Rags.
Goodwin, Cobb & Co., Cymene, Liverpool, 170 bales Paper Stock.
W. F. Hawkins, Gadeghin, Liverpool, 160 bales Paper Stock.
C. H. Buckley, Iowa, Glasgow, 24 bales Paper Stock.
J. C. Devlin & Co., A. Campbell, Messina, 60 bales Rags.
Goodwin, Cobb & Co., Indiana, Liverpool, 20 bales Bagging.
" " Marlborough, " 73 bales Bagging.
" " " 17 bales Papers.
Wm. Halsey & Co., Regina, Calcutta, 340 bales Jute Butts.
Bockmayel & Co., " " 340 bales Jute Butts.
C. Ludlam & Co., [illegible], 75 bales Cuttings.
W. J. Clark, Australia, Glasgow, 14 bales Paper Stock.
Hampton & Shaw, London, 21 bales Old Rags.
" " 35 bales Old Papers.
" " 3 bales Gunny Bags.

Sal Soda.

[illegible], Bolivia, Newcastle ... 1084 cks.
J. L. & D. S. Riker, Cymene, Liverpool ... 200 do
Wing & Evans, Unda, Newcastle ... 200 do
Edward Hill " ... 270 do
J. L. & D. S. Riker, Unda, Newcastle ... 270 do
" " Bolivia, " ... 100 do
H. & F. W. Meyer, Unda " ... 100 do
" " Bolivia, " ... 140 do
Wing & Evans, Bolivian " ... 70 do
" " " ... 200 do
Barclay & Livingston, Bolivian " ... 140 do

Soda Ash.

J. L. & D. S. Riker, J. Pearce, Jr., Liverpool ... 60 cs.
Edward Hill, Bolivia, Newcastle ... 272 cks.
" Indiana, Liverpool ... 75 do
C. P. Sumner, Geringe, Liverpool ... 80 do
[illegible] & Renwick, Geringe, Liverpool ... 30 do
H. & F. W. Meyer, Republic, " ... 40 do
H. J. Baker & Bro., Cymene, " ... 45 do
Wing & Evans, Unda, Newcastle ... 170 do
" " Glendevon, Liverpool ... 15 do
Geo. F. Gantz & Co., Bolivia, Newcastle ... 100 do
J. L. & D. S. Riker, " " ... 50 do
" " Damian, Liverpool ... 54 cks.
" " " ... 20 cks.
" " Republic, " ... 75 do
C. P. Sumner, Emily Augusta " ... 30 do
H. J. Baker & Bro., Geringe, " ... 30 do
W. J. Clark, " ... 36 do
E. C. De Rayter & Co., " ... 35 do
J. L. & D. S. Riker, Republic, " ... 35 do
Goodwin, Cobb & Co., " ... 100 do
J. L. & D. S. Riker, Calliope " ... 100 do
" " Marlborough " ... 61 do
" " " ... 30 do
H. J. Baker & Bro., " ... 40 do
Rice & Davis " ... 30 do
E. Caylus de Rayter, Glendevon " ... 40 do
J. L. & D. S. Riker, Emily Augusta, Liverpool ... 40 do
W. Cunningham & Son, Calliope " ... 50 do
J. L. & D. S. Riker, Amity Augusta " ... 60 do
H. & F. W. Meyer, Unda, Newcastle ... 30 do
E. Caylus de Rayter & Co., Geringe, Liverpool ... 41 cks.
W. F. Hawkins, Gadeghin, Liverpool ... 10 do
James Lee & Co., Iowa, Glasgow ... 45 do
H. & F. W. Meyer, Bolivia, Newcastle ... 170 do
Barbour Bros., Alexandria, Glasgow ... 9 do
Wing & Evans, Ocean, Liverpool ... 38 bxs.
J. L. & D. S. Riker, Egypt, " ... 78 do
" " England " ... 70 do
C. P. Sumner " " ... 56 do
J. L. & D. S. Riker, England, Liverpool ... 70 cks.
James Lee & Co., Bolivian, Newcastle ... 54 do
H. & F. W. Meyer, Ocean, Liverpool ... 45 do
J. L. Thompson Son & Co., Calliope, Liverpool ... 30 cks.
Wing & Evans, Bolivian, Newcastle ... 74 cks.
Geo. F. Gantz & Co., Bolivian, Newcastle ... 18 do

EXPORTS of Paper, &c., from New York to foreign ports, for week ending May 21, 1872.

Danish West Indies.			
Paper	Reams.	350	$160
Hamburg.			
Paper	Cases.	16	400
Liverpool.			
Books	Cases.	15	1,100
Books	Parcels.	344	1,000
Bremen.			
Books	Parcels.	3,400	10,000
London.			
Books	Parcels.	950	2,000
Glasgow.			
Books	Parcels.	500	2,100
British West Indies.			
Paper	Reams.	100	75
Havre.			
Stationery	Cases.	8	1,300
Canary Islands.			
Paper	Reams.	1,000	487
Cuba.			
Paper	Reams.	8,740	4,110
Stationery	Cases.	3	100
Paper	Packages.	40	1,110
Books		1	100
Leghorn.			
Books	Parcels.	8,700	11,000
Trieste.			
Books	Parcels.	300	1,400
Egypt.			
Stationery	Cases.	1	100
Mexico.			
Paper	Packages.	6	51
Central America.			
Stationery	Reams.	30	100
New Granada.			
Paper	Packages.	110	417
Paper	Reams.	170	170
Venezuela.			
Books	Parcels.	100	300
China.			
Books	Cases.	8	67
Books	Parcels.	50	100
Total			$43,[illegible]

IMPORTS of Paper and Paper materials, Books, &c., at the Port of New York, for the week ending May 17, 1872. Quantities given in packages when not otherwise specified.

		VALUE.
Alum	5	$60
Aluminous Cake	30	300
Bleaching Powder	300	4,300
Soda Ash	900	22,077
Sal Soda	2,428	11,094
Soda Bicarb	4,000	12,005
Soda Caustic	618	10,000
Ultramarine	21	1,670
Books	207	32,770
Newspapers	60	2,100
Engravings	60	10,194
Ink	11	300
Lead Pencils	14	2,400
Paper	258	16,400
Steel Pens	5	2,170
Stationery	16	300
Clay		1,400
Jute Butts	2,500	21,400
Jute Cuttings	400	4,000
Jute Rejects	616	3,300
Paper Hangings	740	3,217
Rags	3,360	66,777
Total		$190,300

IMPORTS of Paper, Paper Stock, Books, &c., at the Port of New York, for the week ending May 24, 1872. The quantity given in packages when not otherwise specified.

Alum	600	$2,021
Bleaching Powders	1,010	20,713
Soda Ash	2,925	47,071
" Bicarb	2,300	7,900
" Caustic	1,000	33,542
Anti-Chlorine	18	420
Sal Soda	2,000	10,300
Ultramarine	100	3,914
Books	300	44,587
Newspapers	40	2,560
Engravings	30	14,070
Ink	184	3,100
Lead Pencils	20	3,100
Paper	1,500	47,700
Steel Pens	1	132
Stationery	48	1,106
Clay		800
Jute Butts	2,300	10,600
" Cuttings	200	3,100
Paper Hangings	10	672
Rags	8,000	200,423
Total		$426,107

COMMERCIAL JOURNALS.

The Philadelphia *Commercial List*, speaking of the importance and value of commercial journals, says:

"In the present age of active business enterprise this class of journals has become a necessity in all large communities. In fact, it is no hyperbole to say that, in a strictly business point of view, commercial journals are more important in their sphere, and yield a more legitimate influence than the ordinary daily newspaper, which merely records the passing events of the day or hour. The field of labor occupied is more extensive, and the labor itself more responsible and onerous; but if rightly performed, it is of incalculable benefit both to individuals and classes in the community. The general pulse of trade, commerce and finance, the condition and wants of the various markets, the prospects ahead, whether presenting an encouraging or threatening aspect—these constitute the vast field which the manager of a commercial journal has to scan, and none but those actively engaged in it can speak intelligently of the intense toil inseparable from such an office.

"In all great commercial marts these journals are regarded as indispensable, and where a wise forethought prevails they are well supported. It has been said, and we think rightly, that the character of a city can be told from its leading business paper. Where enterprise exists it will invariably show itself, not only in the advertising columns, which are the arteries of the newspaper system, but in the editorial columns, which are its head, the paper the type, and all the other accessories of journalism. These points are now so well understood and admitted that sagacious business men make it a question of personal pride, as well as profit, to extend a liberal support to the journals which are so intimately allied with their interests. These men, if possessed of ordinary sagacity and foresight, rarely fail in business; whilst those who are niggardly in their patronage are the 'penny wise and pound foolish' men, who prefer to trust to the accidents of trade rather than to grasp at the certainties."

INDUSTRIAL EXHIBITIONS.

A number of Industrial Exhibitions are being held or in preparation throughout the United States or abroad, at which ample arrangements will be made to represent the paper interest.

At the London International Exhibition, which was opened May 1st, at South Kensington, the manufactured division will include stationery and modes of printing. Although the direct object of the commissioners is to show the advance which the most civilized nations have made in the power of diffusing knowledge by means of the printing-press, they desire to include a series of specimens illustrating the comparative state of paper-making and printing all over the world, so that this branch of the exhibition will be as complete and exhaustive as possible.

At the Exhibition to be opened in Paris on the 15th of July, by the National Society for the Encouragement of Labor, it is proposed to make known to the laboring classes the nature of all articles used for housekeeping, clothing, food, and work in different parts of the world, to give prizes and diplomas to the heads of industrial establishments and to workmen who have invented new appliances or improved upon the old, to illustrate by suitable combinations the various methods of labor, and to stimulate a spirit of inquiry and wholesome rivalry. The French Consul in Boston, M. Beamon, requests the co-operation of Americans in the purposes of this Exhibition. Contributions must be registered at the office of the Society, No. 20 Rue de la Chaussee d'Antin, Paris, before the 1st of August. The Exhibition will continue open until the middle of October.

At the coming Industrial Exhibition (the 40th) of the American Institute, in New York, September 7th, ample preparations have been made by the managers for the display of processes and products relating to paper making. Additional space has been added to the Rink, making at least 12,000 square feet more room. The managers, while anxious to make as fine a display as possible of finished products, especially desire that this shall also be an exhibition of the most advanced methods, processes, and operations of American industry. The manufactured article will show what American skilled artisans can accomplish; the machinery will show by what marvellous mechanical agencies they succeed; but in addition they are to have the busy operatives seen with the machinery actually at work upon the raw or half-finished material, producing before the eyes of wondering spectators the very article which, for its beauty or utility, they so much admire. Several manufacturers have already indicated a desire to exhibit, on a small scale, in the manner indicated, and the Board of Managers hope to make this a marked feature of the exhibition.

In the department of Fine Arts and Education, the sixth group will include specimens of printing and bookbinding, books, stationery, ornamental penmanship, globes and maps. In the department of the Dwelling, third group, paper hangings will be represented; while portable writing-desks, portfolios, pocket pens, pencils and pocket-books will be found in the seventh group of the department of Dress and Handicraft; specimens of bleaching inks, fibre and leaves will be included in the department of Chemistry; while in the department of Engines and Machinery will be represented machinery for preparing fibres and tissues, machinery used in printing and in the manufacture of papier-mache and paper. Under the head of Intercommunication will be found materials and implements used in printing, engraving and advertising, besides specimens of ledgers, account-books, blank-books, tickets, tags, cards, etc.

The Institute has decided hereafter to present no medal to any exhibitor, save its great Medal of Honor, which can only be awarded to the discoverer or inventor of a machine, product, or process, so important in its use or application as to supplant any article previously used for the same purpose, or at least to work a favorable revolution in some branch of the useful arts. Instead of the medals and diplomas hitherto granted, each exhibitor will be entitled to a handsome official copy of the Judges' report, made upon the particular merits of the exhibited article, without comparative reference to other articles on exhibition. It is believed that, by this new plan, more general satisfaction will be given.

The Austrian International Exhibition, to be opened in 1873, will make a separate group of paper industry, and will have several very novel and interesting features, as objects illustrative of the history of inventions, with a comparison between the products of machine and hand labor. The history of industry, of prices, and of natural productions will be illustrated in a like manner, while it is also intended to show the application of waste in manufacture, and the astonishing results that have thus been made.

The importance of the paper making interest is shown by the large space allotted to it, and paper manufacturers and dealers, as well as printers, publishers and stationers, ought to be well represented at these exhibitions.

THE LACK OF WATER.

Owners of mills who are suffering for lack of water to run their work, may be interested in the following extract from a late issue of the *Boston Journal*, on the universal need of rain: "From the agricultural districts, especially in the Middle and Northern States, comes a general complaint of low streams, dry wells and parched ground. Our exchanges from nearly all sections of the country bear out the statement that what is most generally needed now everywhere is a liberal and protracted rain fall. The last Winter closed in upon us without being preceded by the customary heavy Fall rains; and instead of the usual spring freshets this season has been drought. Nor is the United States the only country now suffering from deficiency of rain. Carefully collected returns from England give a general average of only twenty-two inches for the past year, instead of thirty inches, the proper mean rainfall of England. The deficiency is computed at over a million gallons of water for every square mile of British territory. The returns of the windward West Indies for 1871 show a deficiency greater than has been known during twenty-four years preceding; and for the first month of the present year the returns are still more discouraging, the average falling short of that for the same month of the twenty-five preceding years by thirty-five per cent., or more than one-third. All facts now attainable point to the conclusion that the want of water is great and general, and unless the clouds speedily reinforce the springs and rivers and refresh the parched ground, rigid economy in the use and distribution of water will become a necessity."

INVENTORS, ATTENTION.

Among the prizes offered by the Society for the Encouragement of Industry in Paris, are the following, which may interest stationers and others:

For a writing ink that does not corrode metallic pens ... prize, 1,000 francs.

For the manufacture of graphite for pencils ... prize ... 3,000 francs.

As an illustration of the small amount of ingenuity which is shown by the average of inventors, Charles Babbage, the famous calculator, once remarked that the commissioners appointed by the British Government to examine into the methods proposed for preventing the forgery of bank-notes, state in their report, that, out of one hundred and seventy-eight projects communicated to the bank and to the commissioners, there were only twelve of superior skill, and nine which it was necessary particularly to examine.

Among the emigrants who arrived in the United States during the last quarter of 1871 were the following persons: 1 bill-poster, 3 bookmen, 13 book-binders, 2 decorators, 1 designer, 16 druggists, 2 paper-hangers, 40 printers and 2 publishers.

We give to our readers, in this number of the PAPER TRADE JOURNAL, information which no one of them could collect for his own private benefit without an expenditure of scores of dollars, yet which we furnish to our readers for the small price of *five cents*, and propose to give in the future for a similar low rate. A word to the wise is sufficient.

The paper mill of Mullin, Parker & Co., at Carlisle, Pa., was burned recently, causing a loss of $45,000.

M. de Bismarck is about creating large paper mills on his domain of Lauenburg, similar to those already at work on his Varzin estate.

ESPARTO:

THE FUTURE CULTIVATION, PAST HISTORY AND FUTURE PROSPECTS.

A Paper read before the English Society of Arts,
By Samuel Sanderson, Esq.

Important use of the Esparto Plant.—Esparto, or Spanish Grass, is a fiber which has for some years past been more or less familiar to the paper manufacturers of England. The *Times* is printed on paper made more or less from the material, and so are many of our leading journals, privileged lists and certain publications generally.

Rapid Increase in its Consumption.—In the year 1861, some 20 tons were imported. In 1870, the consumption had risen to over 100,000 tons, and in the first eleven months of the present year the imports have exceeded 120,000 tons, being in various degrees in excess of the importation of any year, and for months entered in excess only.

In the year, from 35 per ton in 1860, but risen to £16, which had been the highest price during the present year, though to-day, owing to the arrival of the new crop, it is temporarily quoted at from £7 to £11 10s. ton.

Object of the present Paper.—Owing to various circumstances, however, the production attending the growth and harvesting of the esparto plant, have never, as yet, reached the extreme which they deserve; and it will be the object of the present paper to give some brief details of the various ends by which the plant is managed, and further to the possibilities of its rich and successful development, if those ends are wrested from proper methods and precautions are adopted.

Esparto Field Districts.—In the first land, then, to supply a few definite facts on the plant itself, and on the climate and soils that are specially favorable to its growth. Secondly, some account will be given of the time and mode of harvesting. Thirdly, a few words will be added as to the quantity of esparto that may be inferred to have been in growth in Spain at the time of its first introduction into English trade; and, further a mention of its local uses, as to more particularly suggest other lands to explain the rapid deterioration and destruction of the plant through a want of sound system when the demand suddenly arose; and fourthly, a series of suggestions will be offered on the best modes of preserving, cultivating and preparing esparto, the whole being based on a close observation and practical experience running over several years. The paper will be concluded by a summary of general deductions with reference to this hitherto valuable growth of resources.

I.—GENERAL ACCOUNT OF THE PLANT.

Esparto known to the Ancients.—Esparto is to survive in the field of practical use. Strabo (*Epistle* iv.) mentions it as the material of things as different as the fine tackle of ordinary diver; Ulay (xxii) tells us that Hannibal caused a large quantity for various uses early in the Second Punic War; and Pliny has many more than one allusion to the plant.*

Botanical Classification.—The Latin name is some days was esparto, in more recent Latin it is the *Stipa tenacissima* of Linnæus, and the *Macrochloa tenacissima* of Kunth; and its name in Spanish Spanish of to-day is *esparto* (feather grass or bent-grass), or *atocha* (a long strong rope).

Appearance and growth.—It grows in large clusters from two to ten feet in circumference, and spreads between these clusters carry off to the extreme under any excessive wet from rain or inland river. The leaf—the part utilized in trade—grows to a length varying from the inches to three feet. A medium aspect leaves the finer fibre; less genial quarters, and a higher altitude crop from the coast, produce the longer and coarser qualities. The leaves are from one-half a half to four millimeters in diameter, and through decline during growth, when they ripen they become dry and closed, with the pores, filaments, resistive appearance by which esparto grass is endlessly known to trade. They are smooth, the very reverse, and there is a joint or articulation, called the *nos* or "nail," where the blade and the stem.

The Rootlet.—The same station is given to the junction of the second growths as daily cause of the plant with the perennial root that lives for time. The *nos* is also cylindrical, and though robust knots, it is covered with short hairs, making it rough to the downward touch. The rootlets first appear in December or January, and continue growing till Spring, when the ear shoots itself. This grows to upwards of four and a half feet in height, makes an excellent and browns itself for cattle, and inherent of scarcity is used for that purpose. The flowering follows in April or May, the ripening in May or June, the falling of the seed in June or July, and its germination in the Autumn following. Seed is produced for the most part annually, and its quantity depends much upon the rainfall.

Early delivery.—Period of growth.—The young seedling is very delicate and easily killed by hoe frosts. For the first two years the early growth is scarcely perceptible; even at the end of that time it is hard to distinguish variety of esparto, and the process of growth continues for no less than 12 or 16 years, at the end of which period, and not till then, the plant will begin to produce merchantable esparto. It may then improve and develop, under proper conditions, up to a great age.

Climate.—The best climate for its growth is that of the sea-coast, and at moderate altitudes. Whether the plant is due to iodine or to chloride of sodium, or to a combination of such chemical substances, the fact remains that no esparto will compare with those on the coast. Here is found the fine, short, even esparto, so much prized by the paper manufacturer, a fiber of such sound quality as even to suggest the inquiry whether it might not be turned to use for the textile purposes as well. Sensitive to as useful as an ox, and absolutely proportionately horrid.

Inland Districts compared with *Coast Lands.*—It must not be supposed, however, that the seaside position, though invariably beneficial, is indispensable. Equally fine growths, though with a longer leaf, occur in good inland situations, the difference being one of relative proportion. On the sea-coast the whole of the esparto grows in the short, finely-fibered group; in the interior this prime sort will form one-half, and sometimes not more than one-fifth of the whole. The very coarse and rank growth that sets and then finds its way into the market is, in reality, nothing more than the cleansing of old exposed lands of overgrown late cultivation. These very lands, after a few years' proper use and harvesting, will yield as fine a quality, though with a longer leaf, as the finest on the coast.

* Pliny (*Nat. Hist.* xi. 6) mentions white deposits of calcareous appearance in Spain. Columella, xii. 7, mentions the plant, together with the orcanet, as best to appear upon the ground. Pliny again (xxiv. 9) says it grows on the spartum, which, says the learned translator, was the broadest leaf from which the Carthaginians, under Hannibal, had fed. This was used generally a group of ten; and since is no reason to suppose that the plant was not indigenous on both sides of the Mediterranean from a very remote time.

16-tch.

Salt.—Esparto is sometimes found in a thinly-crusted damp soil—sometimes in sandy. In produce lime and chalk, and never reaches perfection in clay. Depth is not necessary, nor richness, though it must be remembered that esparto has hardly yet been tried in rich soil, having been regularly established up to under-rents for cereals or other more profitable crops in lands rich enough to bear them.

Garbills.—The short, and sometimes discolored esparto of the coast is, from its fineness and tenacity, the first favorite to delicate manufacture; but the long, handsome, gold-colored esparto of the interior is a good competitor even for delicate uses, and commands a higher price for other purposes. The same given to this quality is perfect (clean), the straw for cleaning grain being readily done in. Through Antwerp and Hamburg it is largely introduced into Germany, where it is used for basket making and other purposes.

The Esparto Zone.—The esparto zone may be said to run from 38° to 41° north latitude. This includes the southern part of Spain and the northern rim of Africa. In one shape or other the plant is indigenous throughout this zone, at distances ranging from the sea level to about 2,000 feet above it.

Principal Districts.—The esparto proper, as to quals, is indigenous to Spain, and is found in the provinces of Guadalajara, Toledo, Ciudad, Real, Albacete, Cordova, Jaen, Granada, Almeria, Murcia, Alicante, Valencia and Tarragona. The finest qualities are found in Almeria and Murcia. Though the southern belt of Africa and other parts of the Mediterranean coast produce the plant, as has been remarked, in various forms, it is remarkable that Italy, containing Spain in so many of its features, is almost entirely destitute of it.

II.—TIME AND MODE OF RAPPORTING ESPARTO.

Italy the Earliest Time.—Full grass in July, especially in the more sunny localities, esparto should never be collected earlier than that month. Even then it is not always practicable to gather it, as labor will be often pre-occupied by wheat or other crops. The general collection of esparto is then mostly completed before August, from which date until the end of October harvesting may proceed with perfect safety. If from scarcity of hands, or want of means, the grower should be run on, as is sometimes the case, until a considerably later date, very serious injury and deterioration of the plant will follow, on which subject more will be said presently.

Operation of Pulling the Leaves.—The operation of harvesting is not performed by mowing, but by pulling the leaves from the stocks. When fully ripe, between July or August and October, the leaf, with a steady pull, quits the stools, which it leaves subjected in the ground, ready to send forth its shoots in November or December for the growth of the following year.

Various Methods.—The pulling of the leaf is accomplished by various methods. One is by means of a short forestall-shaped piece of wood, armed somewhere or another. This image suspended by the handle from the harvester's shoulder, rests at ease. With the right hand the handful of the tops of the esparto and seizes them as much as the pulsed end of the forestall, upon which, with a sudden upward and sideward pull, the esparto leaves are torn from the stocks, and left collected in the left hand. After greater this operation is performed with great quickness and dexterity. A second method is the use of a flat piece of leather, long by a short cord from the wrist, and much pleated inside like the drawstick. A third is by the hand only, protected from injury by a leather covering. As soon as the left hand has collected as much as it can grasp between the index-finger and the thumb, the handle is secured by a turning of its own leaves, and laid on the ground to dry. Every two of these handfuls make up a cuerada; ten or twelve cuerdas make a large bundle or *haz*; and every three of these make a *carga*, or donkey-load. The cargo, when dry, weighs about 6 arrobas (2 cwt. 16 lbs.), and is the acknowledged measure by which esparto is bought in the interior.

Dry Weather Essential.—The harvesting should never go on except in dry weather. Rain makes the articulations connecting the leaves with the reigns grow softened and swollen, so that they resist the pull with tenacity; at the same time the ground has grown so far soft that it allows the root to be torn up by the pull, which naturally results in extermination to the plant and consequents to the paper-maker, who finds a material weighed with his exports, and yet constituting not only a loss in itself, but an expense in expenditure.

(*To be Continued.*)

Advertisements.

Bargh, Warren & Co.

Paper Warehouse

DEALERS IN

PAPER

AND

Paper Materials

OF ALL KINDS,

No. 16 South Sixth St.

PHILADELPHIA.

MACHINERY FOR SALE.

ONE 32-inch MOULD, 66 inches

Journals 9 inches outside length, with 2½ inch diameter. Strength 2½ inches wide and 1¼ inches deep etc. Size 5 inches square, and pinched here 1¼ inches apart. All of brass, complete order. 60 pounds.

One brass baby engraved, and covered with Nos. 40 and 12 brass wire cloth, AS GOOD AS NEW.

Address

JAMES F. PORTER,
No. 69 Duane St., New York.

Established 1866.

PAPER STOCK.

OFFICE OF

TAYLOR & DARROW

7 & 9 ELM STREET,

NEW YORK, *June*, 1872.

Having largely increased our sources of supply, we are enabled to offer Paper-Makers the best assortment of PAPER for Paper Stock obtainable in the United States, composed of the following LEADING GRADES, in large quantities:

X.C.C.—Cellar cuttings, all paper.
M.C.— " " pasteboard.
B.S.—Blank Book shavings.
M.—Perfectly pure unbleached shavings.
W.M.—White unsorted shavings, considerable thick.
W.S.—White assorted shavings, fair quality.
X.C.E.—Extra colored shavings.
No. 1, S.S.C.—High grade folded sheets, imperfections.
L.S.—Light and unsorted " "
D.—Crumpled and cellar " "
P.—Dirty imperfections, prints.
P.M.—Pure bundles.
B.M.—Bogus bundles.

Selling nothing but our own packing, we guarantee satisfaction.

Prices upon application.

Respectfully, &c.,

TAYLOR & DARROW,
7 & 9 Elm Street, New York.

REMOVAL.

R. B. BRIGGS & CO.

HAVE REMOVED TO

Nos. 68, 70 & 72 Centre St.,

COR. OF WORTH ST. NEW YORK.

Having increased facilities in all branches of the business, orders from Paper Makers for any grade of stock will be filled with promptness.

J. BAIRD, SONS & CO.

IMPORTERS AND DEALERS IN

ITALIAN MARBLE

AND

RAGS,

214 South 24th St.

PHILADELPHIA, PA.

R. B. BRIGGS & CO.

Nos. 68, 70 & 72 Centre St.,

COR. OF WORTH ST. NEW YORK

DEALERS IN

FOREIGN and DOMESTIC

PAPER STOCK.

ALL GRADES OF FOREIGN AND DOMESTIC

RAGS,
PAPERS,
ROPE, and
BAGGING,
For Sale.

PERKINS & GOODWIN,

COMMISSION

Paper Warehouse,

IMPORTERS AND DEALERS IN

PAPER MAKER'S SUPPLIES OF ALL KINDS.

SPECIALTIES IN PAPER,

Book & Straw Print,

84 Duane Street,

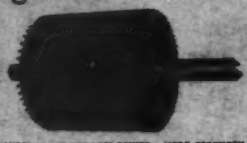
Three doors east of Broadway,

NEW YORK.

SOMETHING NEW IN PAPER MACHINERY.

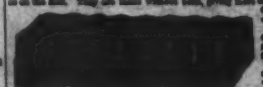
TAYLOR & BRIGHTMAN'S PATENT

Corrugated Engine Roll & Bed Plate.



IT IS A WELL-KNOWN FACT with all paper makers that the Corrugated Roll and Bed Plate, of late years, have been an improvement over the old Roll and Bed Plate. After a series of experiments, we have produced a Roll and Bed Plate that has many advantages over that now in use, almost the same time. These advantages and improvements over the ordinary Engine with straight Bars, some of which we will enumerate:

MORE CAPACITY AND BEATING SURFACE. TAKES LESS POWER. MORE STRENGTH. CUTS LONG STOCK. DOES NOT CLOG THE STUFF AT END OF ROLL, WHERE A LARGE AMOUNT OF POWER IS WASTED. THE IRWIN MOTION PREVENTS SLIPPING, OR CUT RULL. LESS LIABLE TO INJURY FROM IRON OR OTHER FOREIGN SUBSTANCES GETTING INTO THE ENGINE. CAN BE ATTACHED TO THE OLD GRINDLE IN A FEW HOURS.



Many improvements have been made in Rolls, over the old Shoe Plates, down to the Angular Bar Plates. We claim the same improvement on the Bed Plate, over all others, as on the Roll. They are made without holes, giving more depth of steel, or cutting surface. We can make the Rolls or Beds any desired thickness of steel any desired thickness of steel any number of bars, and of any pattern of Bar. Cannot be torn to pieces. Cannot, in the Bed, get out of order.

The Corrugated Bed has the advantage over the Angular Bed—the Bars are broader at the cutting bottom, and there is no sharp corner at the bend of the Bar.

We fill our Beds with a water-proof filling; the old materials have no action on the filling, so they do when used in steel.

TAYLOR & BRIGHTMAN, Cleveland, Ohio.

BRAUTIGAM & WATSON,

(SUCCESSORS TO WHITE, SHEFFIELD & CO.)

IMPORTERS OF

Paper-Makers' Stock & Materials

AGENTS FOR

WHITEHEAD'S FELTINGS;

POOHIN'S PATENT ALUMINOUS CAKE;

CURTIUS' ULTRAMARINE.

DEALERS IN

Foreign and Domestic Rags.

63 & 65 BEEKMAN STREET,

A. C. BRAUTIGAM,
GEO. WATSON, JR. } *New York.*

The Only SELF-FEEDING PAPER STOCK CUTTER manufactured in this country.

REUBEN DANIEL'S PATENT SELF-FEEDING

PAPER STOCK CUTTERS.

GUARANTEED SUPERIOR TO ANY CUTTERS NOW IN USE IN THE UNITED STATES. WE WARRANT THESE NOT TO INJURE IN CUTTING ANY KIND OF PAPER STOCK.

Our No. 1 ONE BLADE CUTTER will cut 1000 lbs. two inches long, per hour, and other work in proportion, and is the best adapted for cutting hard stock, such as rope and heavy rocks, without being split, as is customary with other cutters.

Our No. 2 TWO BLADE CUTTER will do double the work on soft stock, and is at all times to unknown.

No. 3 REVERSE CUTTER, manufactured especially for cutting rope lines. They do not at a loss of one inch or over in the rope by the knives without being cut. They are rope equally as well as our other machines, and cutting and other paper stock very well, but not so fast.

We are making machines particularly adapted to cutting STRAW FOR PAPER STOCK. These machines are related with revolving blades, and cut rapidly at the rate of one ton per hour if properly loaded, and are arranged to cut any desired length.

With an experience of over forty years as manufacturers, and by quoting as reasons at least, we shall continue to be with manufacturers with the best durable and reliable Paper Stock Cutters. These desiring such will have to keep satisfy in ordering of us, for, if any machines do not work as we represent, and give entire satisfaction after a trial of ten days, we will take them back and remove them from the premises free of cost, upon notice that they are subject to our order.

	Weight	Price.
No. 2 RAG AND ROPE CUTTERS,	1800	$225
No. 3 ROPE KNOT CUTTER,	1900	225
No. 3 STRAW PAPER STOCK CUTTER,	900	175
No. 4 WOOLEN RAG CUTTER,	720	125

We have greatly increased our Cutters of late in the interest of lightening the bearings so as to keep them in perfect running order without repairing.

DANIELS MACHINE CO., Manufacturers,

REUBEN DANIEL, President. Woodstock, Vermont.

☞ Orders or communications promptly attended to.

Reference may be had to the following manufacturers, who have been one to eight years each cutters now in use:

WM. RUSSELL & SON,	*Belfast, Me.*
D. HUNTER & CO.,	*North Bennington, Vt.*
S. D. WARREN,	*Boston, Mass.*
FRANKLIN PAPER CO.,	*Holyoke, Mass.*
SMITH PAPER CO.,	*Lee, Mass.*
SEYMOUR PAPER CO.,	*Windsor Locks, Conn.*
BUCKLEY, DUNTON & CO.,	*New York.*
JESSUP & MOORE,	*Philadelphia, Pa.*

and hundreds of other mills in all parts of the country.

SHERIDAN'S

Patent Sliding-Knife

PAPER CUTTER,

FOR

Paper-Makers, Printers,

BLANK-BOOK MANUFACTURERS,

&c. &c. &c.

This Machine, by the intimate combination of power applied by the use of the lever, is by far the most powerful and rapid in use. By recent improvements they work with not the least jar or noise. A boy can run it.

PRICE—30 inch, . . . $450.00
" 36 " 500.00
" 42 " 600.00

E. R. & T. W. SHERIDAN,
25 Centre Street, New York.

WM. KELLY & SON,

Wholesale Dealers in all kinds of

COTTON and WOOLEN

RAGS,

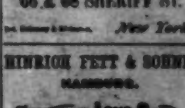
Paper Makers' Stock,
Shoddies, &c.

66 & 68 SHERIFF ST.

New York.

HINRICH FETT & BOHNE,

HAMBURG.



RAMBURG PACKING.

HUGO FETT & CO.

48 New St., New York.

Goodwin, Cobb & Co.

COMMISSION

Paper Warehouse,

IMPORTERS AND DEALERS IN

Bleaching Powders,

Soda Ash,

ULTRAMARINE,

RAGS,

Gunny and Kentucky Bagging,

MANILLA & HEMP ROPE

AND MANUFACTURERS' MATERIALS OF EVERY DESCRIPTION.

BOOK, NEWS,

AND

Printing Paper

MADE TO ORDER AT SHORTEST NOTICE.

16 & 18 READE ST.

New York.

Established 1860

JAMES F. PORTER

Paper Manufacturer,

AND DEALER IN

PAPER

Paper Makers' Stock,

AND

Supplies of every Description

WAREHOUSE,

69 Duane Street,

NEW YORK.

JUTE BUTTS

&

SPECIALTY.

H. C. Hulbert & Co.

IMPORTERS AND DEALERS IN

Paper Makers' Materials,

AMONG THEM

Best English Feltings

ULTRAMARINE,

PEARL HARDENING, &c.

FOREIGN & DOMESTIC

RAGS,

AND ALL GRADES OF

Paper Stock.

ALSO THE

BOOK PAPER

OF VARIOUS QUALITIES

MADE AT SHORTEST NOTICE.

No. 13 BEEKMAN ST.

NEW YORK.

Holyoke Machine Co.

MANUFACTURERS OF THE

AMERICAN TURBINE

Water Wheel

PAPER MACHINERY,

Lindsay Pumps and Hydraulic Rams,

Gas Pumps, Shafting, and

Mill Work Generally.

Holyoke, Mass.

FIRST CAPTIONS OF ALL KINDS.

WANTED

A SECOND-HAND

GAVIT CUTTER

Thirty-six inch, with three knife, and wholly complete. Must be in good order, and cheap for cash. Address,

JAMES F. PORTER,
No. 69 Duane St., New York.